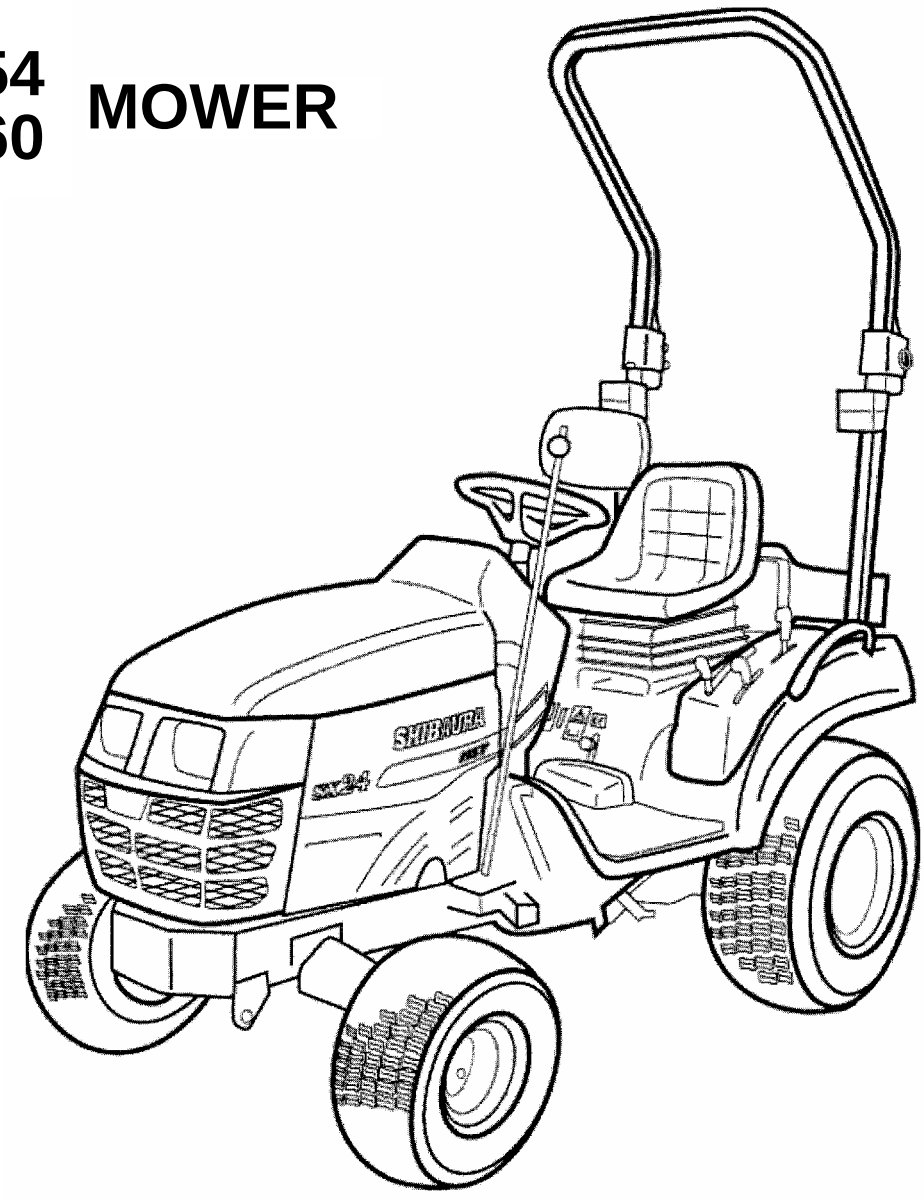
SHIBAURA

OPERATOR'S MANUAL

MODEL

SX21
SX24 **TRACTOR**

SXM54
SXM60 **MOWER**



ISHIKAWAJIMA-SHIBAURA MACHINERY CO., LTD.

TO THE OWNER

This manual contains information concerning the adjustment and maintenance of your SHIBAURA Model SX21 and SX24. You have purchased a dependable machine, but only by proper care and operation can you expect to receive the performance and long service built into this tractor. Please have all operators read this manual carefully and keep it available for ready reference.

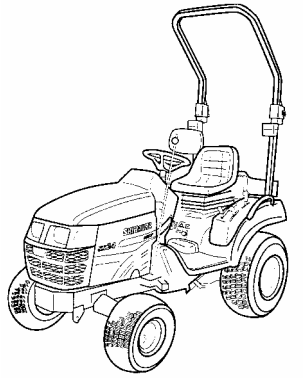
This machine was designed to power and propel itself. It is intended to pull or carry tractor attachments or load and move materials when equipped with a front end loader with a variety of buckets. Only attachments recommended and approved by SHIBAURA should be used with your tractor.

Your SHIBAURA dealer will instruct you in the general operation of your tractor. (Refer to the "Delivery Report" at the back of this manual.) Your dealer's staff of factory-trained service technicians will be glad to answer any questions that may arise regarding the operation of your tractor.

Your SHIBAURA dealer carries a complete line of genuine SHIBAURA service parts. These parts are manufactured and carefully inspected to insure high quality and accurate fitting of any necessary replacement parts. Be prepared to give your dealer the model and serial number of the tractor, when ordering parts. Locate these numbers now and record them below. Refer to the "General Information" section of this manual for the location of the model and serial numbers of your tractor.

Model _____

Serial Number _____



⚠ CAUTION ⚠

This safety alert symbol indicates important safety messages in this manual. When you see this symbol, carefully read the message that follows and be alert to the possibility of personal injury or death.

⚠ CAUTION ⚠

Pictures in this manual may show protective shielding open or removed to better illustrate a particular feature or adjustment.
Be certain, however, to close or replace all shielding before operating the machine.

IMPROVEMENTS

SHIBAURA, Inc. is continually striving to improve its products. We reserve the right to make improvements or changes when it becomes practical and possible to do so, without incurring any obligation to make changes or additions to the equipment sold previously.

CONTENTS

SAFETY 0-5
GENERAL INFORMATION 1-1
OPERATION 2-1
LUBRICATION AND MAINTENANCE 3-1
SXM54, SXM60 MOWER DECK 4-1
SPECIFICATIONS 5-1
INDEX 5-8
PRE-DELIVERY SERVICE 5-10
PRE-DELIVERY CHECKLIST 5-12

Electro-magnetic Interference (EMC)

This tractor complies strictly with the European Regulations on electro-magnetic emissions. However, interference may arise as a result of add-on equipment which may not necessarily meet the required standards. As such interference can result in serious malfunction of the unit and/or create unsafe situations, you must observe the following:

- **Ensure that each piece of non-SHIBAURA equipment fitted to the tractor bears the CE mark.**
- **The maximum power of emission equipment (radio, telephones, etc.) must not exceed the limits imposed by the national authorities of the country where you use the tractor.**
- **The electro-magnetic field generated by the add-on system should not exceed 24V/m at any time and at any location in the proximity of electronic components.**

Failure to comply with these rules will render the SHIBAURA warranty null and void.

PRECAUTIONARY STATEMENTS

PERSONAL SAFETY

PERSONAL SAFETY

Throughout this manual and on machine decals, you will find precautionary statements (“CAUTION”, ”WARNING”, and “DANGER”) followed by specific instructions. These specifications are intended for the personal safety of you and those working with you. Please take the time to read them.

The word “CAUTION” is used where a safe behavioral practice according to operating and maintenance instructions and common safety practices will protect the operator and others from accident involvement.

The word “WARNING” denotes a potential or hidden hazard, which has a potential for serious injury. It is used to warn operators and others to exercise every appropriate means to avoid a surprise involvement with machinery.

The word “DANGER” denotes a forbidden practice in connection with a serious hazard.

Failure to follow the “CAUTION”, “WARNING”, and “DANGER” instructions may result in bodily injury or death.

MACHINE SAFETY

The precautionary statement (**"IMPORTANT"**) is followed by specific instructions. This statement is intended for machine safety.

IMPORTANT: *The word "IMPORTANT" is used to inform the reader of something he needs to know to prevent minor machine damage if a certain procedure is not followed.*

INFORMATION

NOTE: *Instructions used to identify and present supplementary information.*

SAFETY

PRECAUTIONARY STATEMENTS

A careful operator is the best operator. Most accidents can be avoided by observing certain precautions. To help prevent accidents, read the following precautions before operating this equipment. Equipment should be operated only by those who are responsible and instructed to do so.

Carefully review the procedures given in this manual with all operators. It is important that all operators be familiar with and follow safety precautions.

THE TRACTOR

1. **Read the Operator's Manual carefully before using the tractor. Lack of operating knowledge can lead to accidents.**

2. **Use an approved roll bar for safe operation. Overturning a tractor without a roll bar can result in death or injury. If your tractor is not equipped with a roll bar, see your SHIBAURA Dealer.**

3. **Use the handholds and step plates when getting on and off the tractor to prevent falls. Keep steps and platform cleared of mud and debris.**

4. **Do not permit anyone but the operator to ride on the tractor. There is no safe place for extra riders.**

5. **Keep all safety decals clean of dirt and grime, and replace all missing, illegible, or damaged safety decals. See the list of decals in the decal section of this manual.**

SERVICING THE TRACTOR

1. **The cooling system operates under pressure which is controlled by the radiator cap. It is dangerous to remove the cap while the system is hot. Always turn the cap slowly to the first stop and allow pressure to escape before removing the cap entirely.**

2. **Keep any type of open flame away from the tractor and do not smoke while refueling. Wait for the engine to cool before refueling.**

3. **Keep the tractor and equipment, particularly brakes and steering, maintained in a reliable and satisfactory condition to ensure your safety and comply with legal requirements.**

4. **Keep open flame or cold weather starting aids away from the battery to prevent fires or explosions. Use jumper cables according to instructions to prevent sparks which could cause explosion.**

5. **Stop the engine before performing any service on the tractor.**

6. **Escaping hydraulic/diesel fluid under pressure can penetrate the skin causing serious injury. If fluid is injected into the skin, obtain medical attention immediately or gangrene may result.**

   - **DO NOT use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks.**
   - **Stop the engine and relieve pressure before connecting or disconnecting lines.**
   - **Tighten all connections before starting the engine or pressurizing lines.**

7. **Do not modify or permit anyone else to modify or alter this tractor or any of its components or functions without first consulting a SHIBAURA Dealer.**

8. **The fuel oil in the injection system is under high pressure and can penetrate the skin. Unqualified persons should not remove or attempt to adjust a pump, injector, nozzle, or any other part of the fuel injection system. Failure to follow these instructions can result in serious injury.**

9. **Continuous long-term contact with used engine oil may cause skin cancer. Avoid prolonged contact with used engine oil. Wash skin promptly with soap and water.**

OPERATING THE TRACTOR

1. **Before starting the tractor, apply the parking brake, place the PTO lever in the "OFF" position, the lift control lever in the down position, the remote control valve levers in the neutral position, and the transmission in neutral.**

2. **Always sit in the tractor seat when starting the engine or operating controls. Do not start the engine or operate controls while standing beside the tractor.**

3. **Do not bypass the neutral start switches. Consult your SHIBAURA Dealer if your neutral start controls malfunction. Use jumper cables only in the recommended manner. Improper use can result in tractor runaway.**

4. **Avoid accidental contact with the gear shift lever while the engine is running, as this can cause unexpected tractor movement.**

5. **Before getting off the tractor, disengage the PTO, turn the engine off, and apply the parking brake. Never get off the tractor while it is in motion.**

6. **Do not park the tractor on a steep incline.**

7. **Do not operate the tractor engine in an enclosed building without adequate ventilation. Exhaust fumes can cause death or illness.**

8. **If the power steering or engine ceases operating, stop the tractor immediately.**

9. **Pull only from the drawbar or the lower link drawbar in the down position. Use only a drawbar pin that locks in place. Pulling from the tractor rear axle or any point above the axle may cause the tractor to upset.**

10. **If the front end of the tractor tends to rise when heavy implements are attached to the three-point hitch, install front end or front wheel weights. Do not operate the tractor with a light front end.**

11. **Always set the hydraulic selector lever in position control when attaching or transporting equipment. Ensure hydraulic couplers are properly mounted and will disconnect safely in case of accidental detachment of implement.**

12. **Do not leave equipment in the raised position.**

13. **Use the flasher/turn signal lights when traveling on public roads both day and night (unless prohibited by law).**

14. **When operating at night, adjust lights to prevent blinding oncoming drivers.**

DRIVING THE TRACTOR

1. **Watch where you are going, especially at row ends, on roads, around trees and low hanging obstacles.**

2. **To avoid upsets, drive the tractor with care and at a safe speed. Use extra caution when operating over rough ground, when crossing ditches or slopes, and when turning corners.**

3. **To provide two-wheel braking, one pedal actuates both brakes.**

4. **Do not coast or free wheel down hills. Use the same gear when going downhill as is used when going uphill.**

5. **Any towed vehicle with a total weight exceeding that of the towing tractor should be equipped with brakes for safe operation.**

6. **If the tractor becomes stuck or the tires become frozen to the ground, back up the tractor to prevent upset.**

7. **Always check overhead clearance, especially when transporting the tractor.**

8. **When operating at night, adjust lights to prevent blinding oncoming drivers.**

OPERATING THE PTO

1. **When operating PTO driven equipment, shut off the engine and wait until the PTO stops before getting off the tractor and disconnecting the equipment.**

2. **Do not wear loose clothing when operating the power take-off or when near rotating equipment.**

3. **When operating stationary PTO driven equipment, always place both gear shift levers in neutral, apply the tractor parking brake, and block the rear wheels front and back.**

4. **To avoid injury, do not clean, adjust, unclog, or service PTO driven equipment when the tractor engine is running.**

5. **Ensure the PTO master shield is installed at all times. Always replace the PTO shield cap when the PTO is not in use.**

DIESEL FUEL

1. **UNDER NO CIRCUMSTANCES should gasoline, alcohol, or blended fuels be added to diesel fuel. These combinations can create an increased fire or explosive hazard. Such blends are more explosive than pure gasoline in a closed container such as a fuel tank. DO NOT USE THESE BLENDS.**

2. **Never remove the fuel cap or refuel with the engine running or hot.**
3. **Do not smoke while refueling or when standing near fuel.**

4. **Maintain control of the fuel filler pipe nozzle when filling the tank.**

5. **Do not fill the fuel tank to capacity. Allow room for expansion.**

6. **Wipe up spilled fuel immediately.**

7. **Always tighten the fuel tank cap securely.**

8. **If the original fuel tank cap is lost, replace it with SHIBAURA approved cap. A non-approved proprietary cap may not be safe.**

9. **Keep equipment clean and properly maintained.**

10. **Do not drive equipment near open fires.**

11. **Never use fuel for cleaning purposes.**

12. **Arrange fuel purchases so that winter grade fuels are not held over and used in the spring.**

SAFETY FRAME (ROPS)

Your SHIBAURA is equipped with a safety framer. It must be maintained in a serviceable condition. Be careful when driving through doorways or working in confined spaces with low headroom.

UNDER NO CIRCUMSTANCES should you:

- **modify, drill, or alter the safety frame in any way. Doing so may render you liable to legal prosecution.**
- **attempt to straighten or weld any part of the main frame or retaining brackets which have suffered damage. Doing so may weaken the structure and endanger your safety.**
- **secure any parts on the main frame or attach your safety frame with anything other than the special high tensile bolts and nuts specified.**
- **attach chains or ropes to the main frame for pulling purposes.**
- **take unnecessary risks even though your safety frame affords you the maximum protection possible.**

WHEN YOU SEE THIS SYMBOL

IT MEANS:

ATTENTION!

BECOME ALERT!

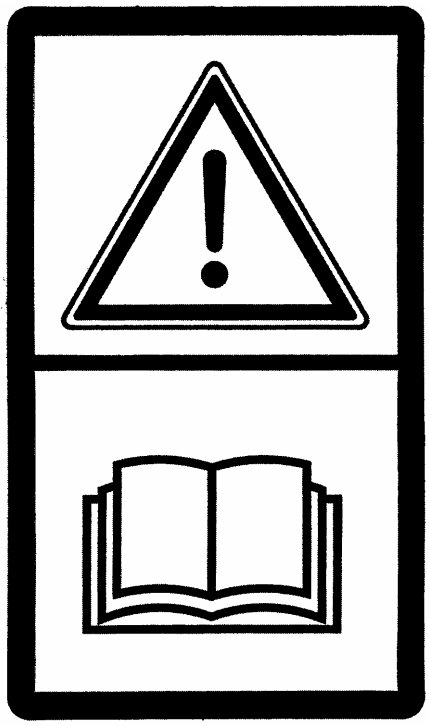
YOUR SAFETY IS INVOLVED!

SAFETY DECALS

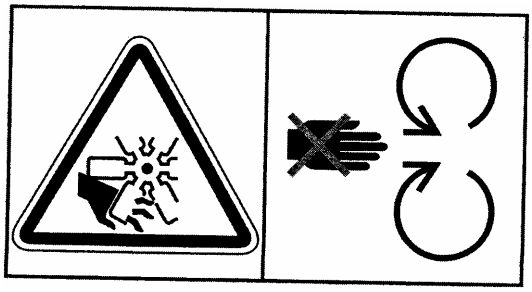
The following safety decals have been placed on your machine in the areas indicated. They are intended for your personal safety and for those working with you. Please take this manual and walk around your machine to note the content and location of these warning signs. Review these warning signs and the operating instructions detailed in this manual with your machine operators.

Keep the decals legible. If they are not, obtain re placements from your authorized dealer. The decal replacement part numbers are listed with each decal.

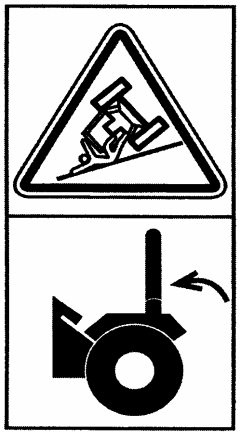
SAFETY DECALS



DANGER:
PART NO: 390197900
LOCATION:
- In Front of Operator's Seat
- Inside of hood

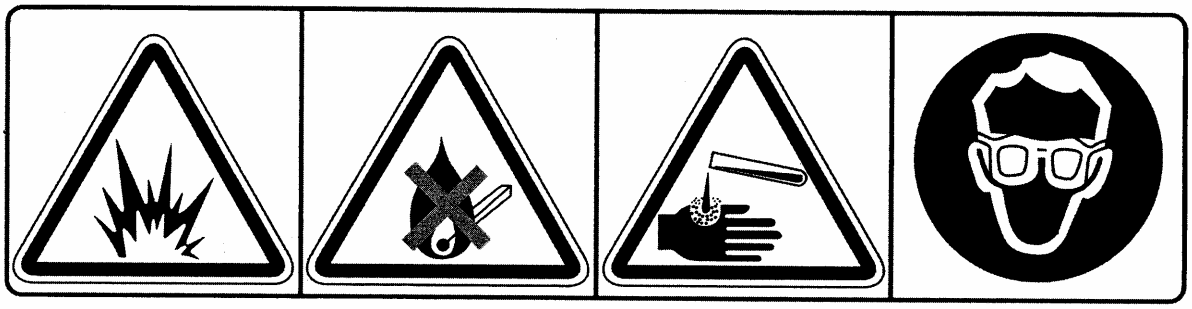


WARNING: Keep Hands and Clothing away from Rotation Fan.
PART NO: 390198020
LOCATION: Rear of radiator



DANGER: ROPS
PART NO: 390198010
LOCATION: Left-hand/inside of ROPS

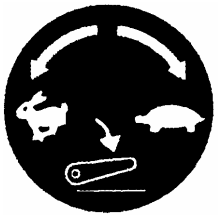
WARNING: Radiator Cap
PART NO: 490992480
LOCATION: On radiator cap



WARNING: BATTERY
PART NO: 490992480
LOCATION: On Battery Holddown

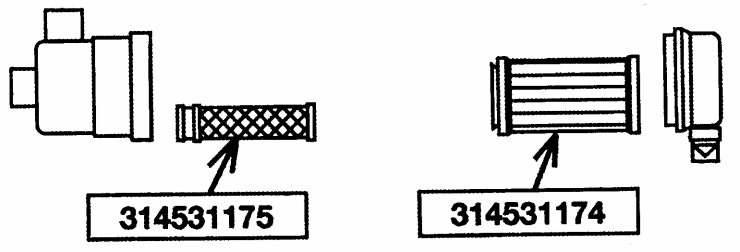
INSTRUCTION DECALS

Range Selector Lever
PART NO: 390174181
LOCATION: Left Control Pod

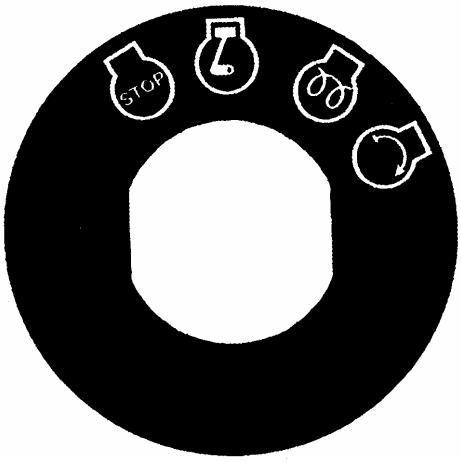


Drop Rate Valve
PART NO: 390372470
LOCATION: Top of Drop Rate Knob

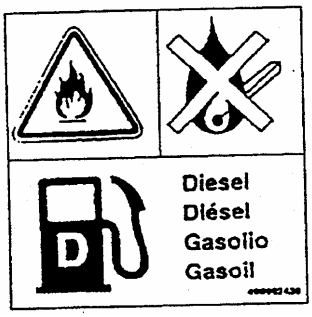
Engine Oil
PART NO: 390230220
LOCATION: On Engine Oil Filler Cap



Air Cleaner Servicing
PART NO: 390198940
LOCATION: Air Cleaner End Cap



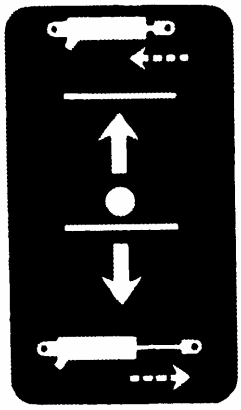
Starter Switch
PART NO: 390197280
LOCATION: On the RH of Dash



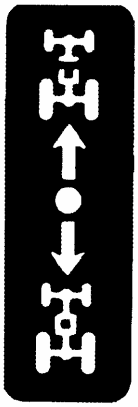
Diesel Fuel
PART NO: 490992430
LOCATION: Near Fuel Cap

INSTRUCTION DECALS

Hand Throttle
PART NO: 390430290
LOCATION: RH side of Console



(Optional)
Operating Remote Control Valve - Single
PART NO: 390370300
LOCATION: Inboard Station RH Control Pod

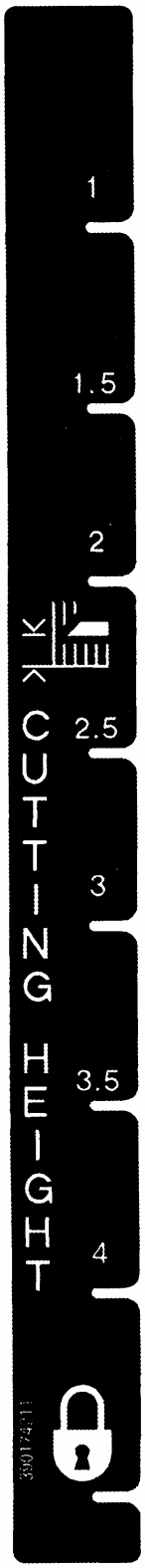


Front-Wheel Drive Control Lever
PART NO: 390173871
LOCATION: In Front of Operator's Seat
Right Side of Platform

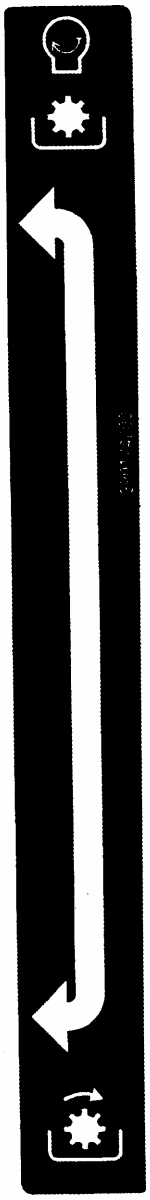
Adjusting Cutting Height
PART NO: 390198950
LOCATION: Left Control Quadrant

Parking Brake
PART NO: 390198361
LOCATION: Near Parking Brake

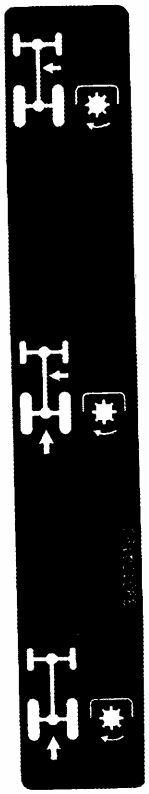
INSTRUCTION DECALS



Mower Height Adjustment
PART NO: 390174212
LOCATION: Left Control Quadrant

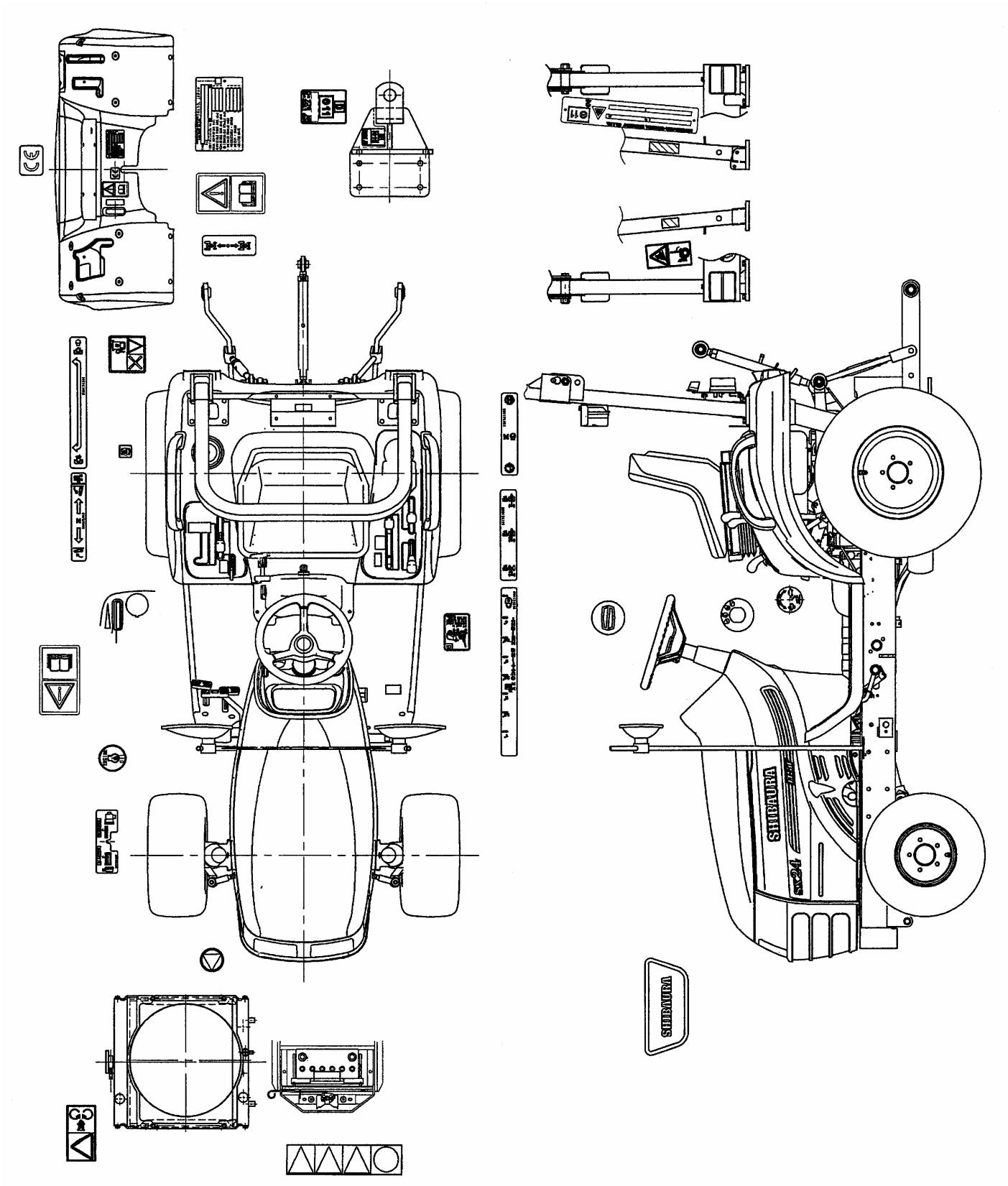


PTO Engagement
PART NO: 390174201
LOCATION: Right Control Quadrant



PTO Selection
PART NO: 390174191
LOCATION: Left Control Quadrant

Hydraulic Power Lift
PART NO: 390372541
LOCATION: Right Control Quadrant


SHIMADZU

ECOLOGY AND THE ENVIRONMENT

Soil air, and water are vital factors of agriculture and life in general. When legislation does not yet rule the treatment of some of the substances which are required by advanced technology, common sense should govern the use and disposal of products of a chemical and petrochemical nature.

The following are recommendations which may be of assistance:

- Become acquainted with and ensure that you understand the relative legislation applicable to your country.
- Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, antifreeze, cleaning agents, etc., with regard to their effect on man and nature and how to safely store, use and dispose of these substances. Agricultural consultants will, in many cases, be able to help you as well.

HELPFUL HINTS

1. Avoid filling tanks using cans or inappropriate pressurized fuel delivery systems which may cause considerable spillage.
2. In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of them contain substances which may be harmful to your health.
3. Modern oils contain additives. Do not burn contaminated fuels and or waste oils in ordinary heating systems.
4. Avoid spillage when draining off used engine coolant mixtures, engine, gearbox and hydraulic oils, brake fluids, etc. Do not mix drained brake fluids or fuels with lubricants. Store them safely until they can be disposed of in a proper way to comply with local legislation and available resources.
5. Modern coolant mixtures, i.e. antifreeze and other additives, should be replaced every two years. They should not be allowed to get into the soil but should be collected and disposed of safely.
6. Repair any leaks or defects in the engine cooling or hydraulic system immediately.
7. Do not increase the pressure in a pressurized circuit as this may lead to a component failure.
8. Protect hoses during welding as penetrating weld splatter may burn a hole or weaken them, allowing the loss of oils, coolant, etc.

UNIVERSAL SYMBOLS

As a guide to the operation of your tractor, various universal symbols have been utilized on the instruments, controls, switches, and fuse box. The symbols are shown below with an indication of their meaning.

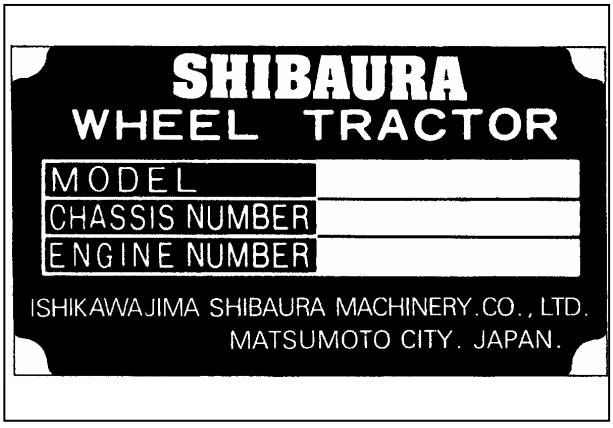
SECTION 1
GENERAL INFORMATION

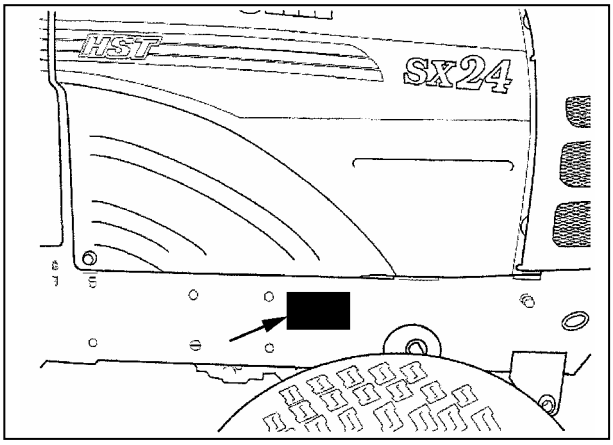
PLEASE READ CAREFULLY:

For a complete list of the pre-delivery service checks performed by your dealer, refer to the PRE-DELIVERY SERVICE check list found at the back of this manual. Keep one copy as your record of the service performed. The other should be removed from the manual and kept by your dealer. MAKE SURE THAT BOTH COPIES ARE COMPLETED AND THAT YOU AND THE DEALER SIGN BOTH COPIES.

After you have operated your tractor for fifty hours, take this manual and your tractor to your dealer. He will then perform the factory recommended 50-HOUR SERVICE as listed on the lower portions at the back of this manual — without charge — except for lubricant, oil, or filters replaced as part of normal maintenance. MAKE SURE THAT YOU AND THE DEALER SIGN BOTH COPIES.

A PRODUCT IDENTIFICATION PLATE is located on the right-hand side of the front frame. The numbers on the plate are important should your tractor require future service. For your convenience, have your dealer record the numbers in the appropriate spaces below.





SHIBAURA policy is one of continuous improvement, and the right to change prices, specification or equipment at any time without notice is reserved.

All data given in this manual is subject to production variations. Dimensions and weights are approximate only and the illustrations do not necessarily show tractors in standard condition. For exact information about any particular tractor please consult your SHIBAURA Tractor Dealer.

METRIC BOLT TORQUE SPECIFICATION

Bolt Size	Grade No.	Coarse Thread			Fine Thread		
		Pitch (mm)	Pounds-Feet	Newton Meters	Pitch (mm)	Pounds-Feet	Newton-Meters
M6	4T 4T 4.8	1.0	3.6 – 5.1	4.9 – 6.9	–	–	–
	7T 7T 8T 8.8		6.1 – 8.3	8.3 – 11.3			
	10T 10T 11T		8.7 – 11.6	11.8 – 15.7			
M8	4T	1.25	9.4 – 12.3	12.7 – 16.7	1.0	11.2 – 14.8	15.2 – 20.1
	7T		16.6 – 21.0	22.6 – 28.4		19.5 – 25.3	26.5 – 34.3
	10T		21.0 – 26.8	28.4 – 36.3		22.4 – 29.7	30.4 – 40.2
M10	4T	1.5	18.8 – 24.6	25.5 – 33.3	1.25	21.0 – 26.8	28.4 – 36.3
	7T		32.5 – 41.2	44.1 – 55.9		36.2 – 46.3	49.0 – 62.8
	10T		39.8 – 51.4	53.9 – 69.6		42.7 – 54.2	57.9 – 73.5
M12	4T	1.75	27.5 – 34.7	37.3 – 47.1	1.25	31.8 – 40.5	43.1 – 54.9
	7T		48.5 – 61.5	65.7 – 83.4		55.0 – 69.4	74.5 – 94.1
	10T		68.0 – 85.4	92.2 – 116		73.1 – 93.3	99.0 – 127
M14	4T	2.0	46.3 – 59.3	62.8 – 80.4	1.5	51.4 – 64.4	69.6 – 87.3
	7T		76.7 – 96.9	104 – 131		86.1 – 109	117 – 148
	11T		102 – 129	139 – 175		108 – 137	147 – 186
M16	4T	2.0	63.6 – 81.0	86.3 – 110	1.5	67.3 – 84.6	91.2 – 115
	7T		110 – 136	149 – 184		116 – 142	157 – 192
	11T		152 – 188	206 – 255		163 – 199	221 – 270
M18	4T	2.0	83.9 – 104	114 – 141	1.5	96.9 – 120	131 – 163
	7T		145 – 174	196 – 235		170 – 206	230 – 279
	11T		203 – 246	275 – 333		221 – 271	299 – 368
M20	4T	2.5	106 – 132	144 – 179	1.5	127 – 156	172 – 211
	7T		177 – 213	240 – 289		203 – 246	275 – 333
	11T		268 – 325	363 – 441		293 – 358	397 – 485

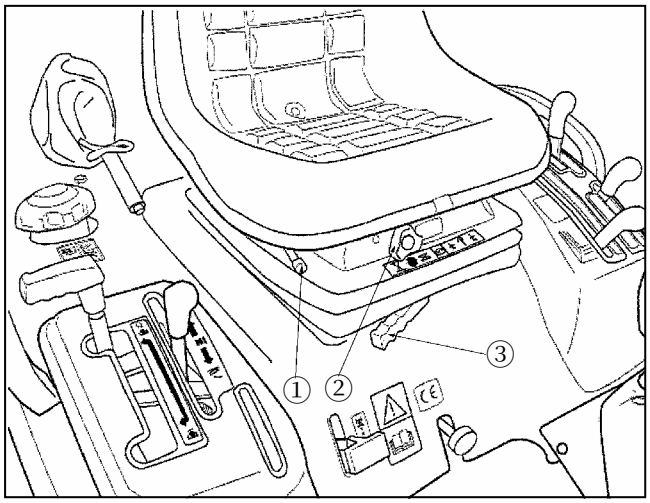
SECTION 2
OPERATION

CONTROLS AND INSTRUMENTS

SEAT, SEAT BELT, AND ROLLOVER PROTECTIVE STRUCTURE (ROPS)

Adjusting the Tractor Seat

Your SHIBAURA Tractor equipped with an adjustable suspension seat.

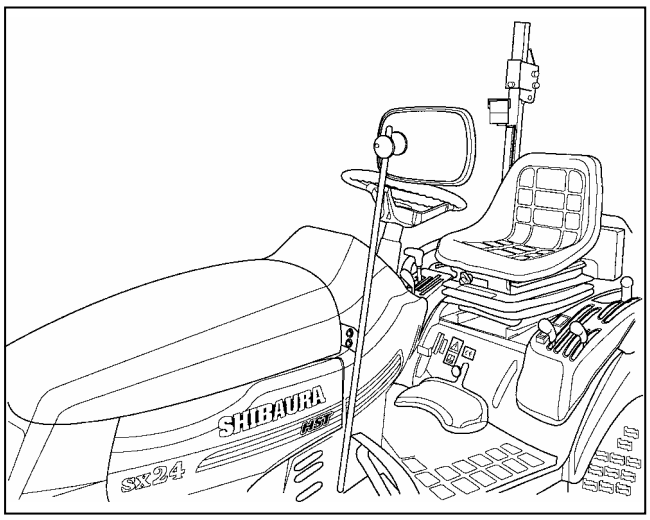


To adjust the seat fore and aft, move the release lever ①, towards the fender, slide the seat to the desired position, releasing the lever to lock.

The seat has seven height position controlled by the knob ②. While sitting in the seat, pull out the knob moving it to the left to increase the height, or to the right to reduce the height.

To adjust the seat suspension for individual operators; with moving the lever ③ straight up, turn it clockwise to be for (+) and turn it counter-clockwise to be for less (-).

Your tractor equipped with a mirror.

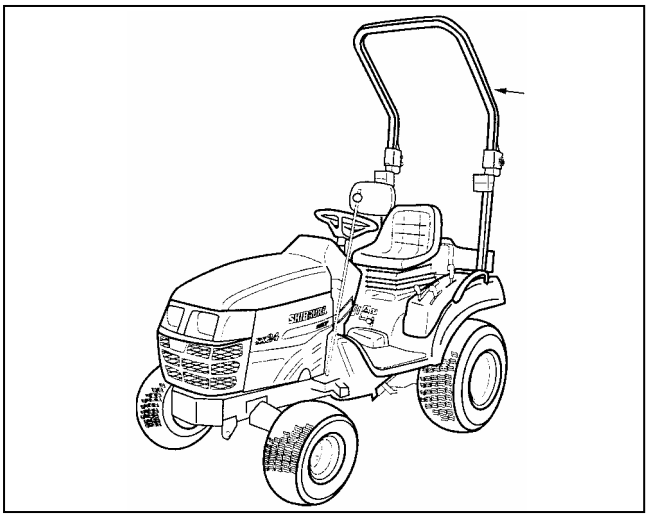


To adjust the mirror, loosen the screw tightened clamp for repositioning the mirror.

ROLLOVER PROTECTIVE STRUCTURE (ROPS)

Your tractor is equipped with a folding Roll Over protective Structure (ROPS). If, for some reason, the ROPS was deleted by the original or has been removed. It is recommended that you equip your tractor with a ROPS.
ROPS are effective in reducing injuries during tractor overturn accidents. Overturning tractor without a ROPS can result in serious injury or death.

Roll Over Protective Structure (ROPS), is available from your SHIBAURA Tractor Dealer.

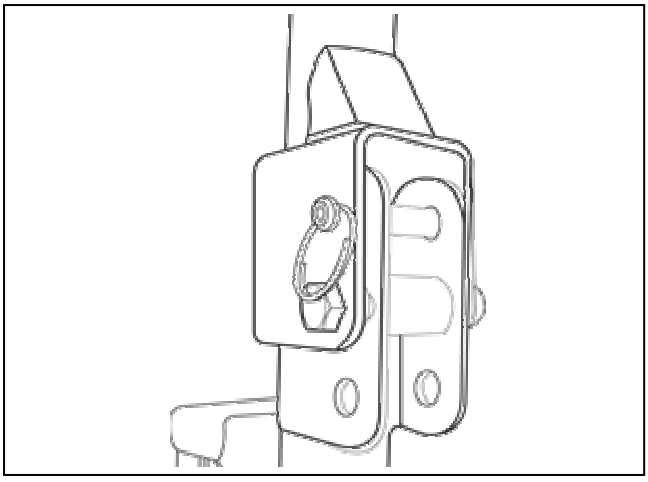


⚠ WARNING ⚠

When improperly operated, a tractor can roll over. For low clearance use only, the ROPS may be lowered.
No protection is provided when the tractor is operated with the ROPS in the lowered position.
Always raise the ROPS and lock it immediately after low clearance work.

Folding the ROPS

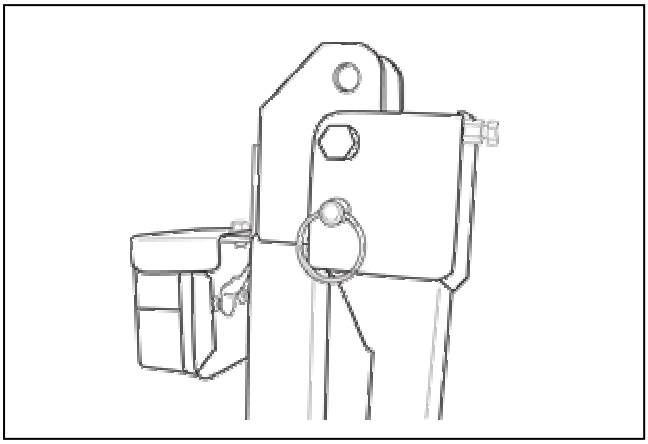
A foldable ROPS is factory installed on your tractor. Operate with ROPS in the raised position whenever possible. Use the ROPS in the folded position only when absolutely necessary.
To fold the ROPS remove two lock pins, lower the upper of the ROPS rearward.



Install two lock pins to anchor the ROPS firmly once in position. To raise the ROPS reverse the above procedure.

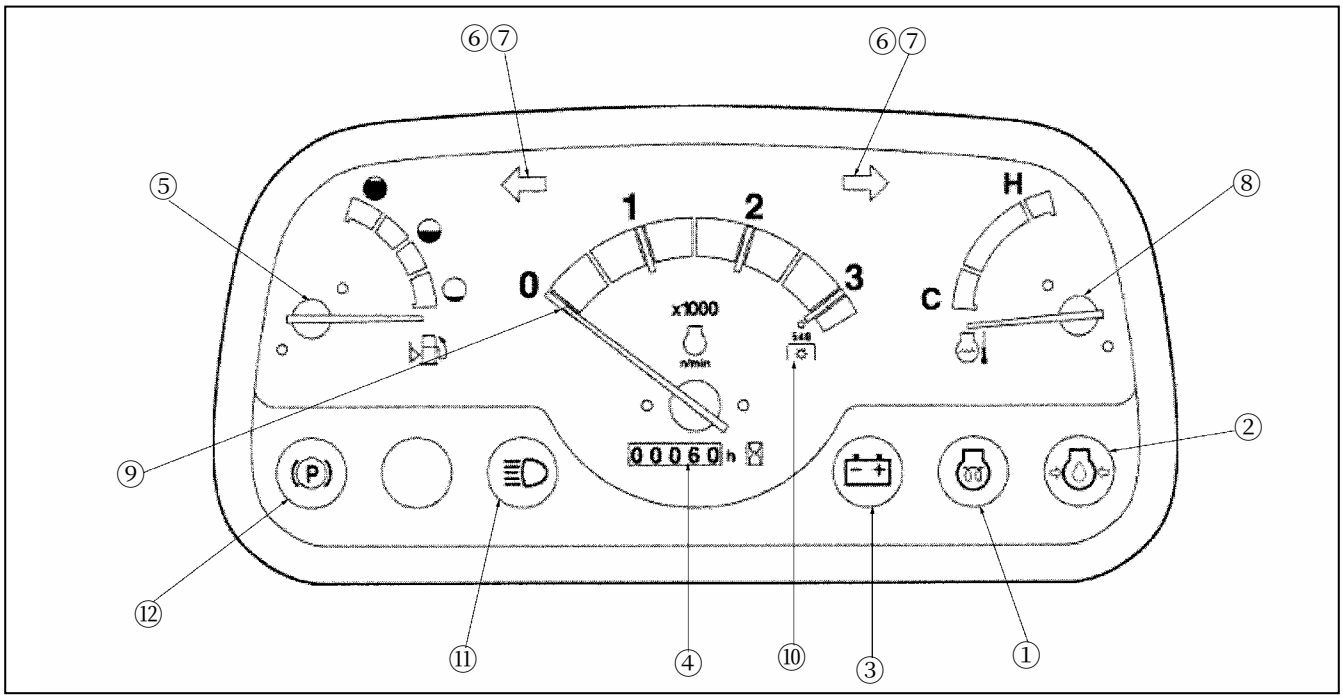
⚠ WARNING ⚠

Do not operate the tractor with the ROPS folded as a standard operating mode. A folded ROPS does not provide rollover protection.



Always pull from the tractor the drawbar. Do no attach chains or ropes to the ROPS for pulling purposes, as the tractor can tip backwards.

INSTRUMENT PANEL



1. Cold Starting Indicator Light – Illuminate when the key switch is turned to the "HEAT" position. It remains lit for approximately 5 seconds when the key is held in position, during which time the glow plugs are heating the precombustion chambers.

2. Engine Oil Pressure Warning Light- Illuminates with the key switch in the "ON" or "HEAT" positions and remains lit for a short period of time after the engine is started. The light indicates oil pressure only and goes out when sufficient oil pressure is present at the oil sender. If the bulb becomes lit during operation, stop the tractor engine immediately and investigate the cause.

3. Battery Charge Warning Light- Illuminates when the key switch is in the "ON" or "HEAT" positions and goes out when the engine is started. If this bulb becomes lit during operation, it indicates that the charging system is not operating normally. As the battery can become fully discharged under these conditions, the problem should be investigated as soon as possible.

4. Proof Meter-Records the hours and portions of hours that your tractor has been operated based on an average engine speed of 3000 RPM. Engine speeds below 3000 RPM accumulate engine hours at a slower rate than clock hours. Engine speeds above 3000 RPM accumulate engine hours faster than clock hours. Use the proof meter as a guide to determine hourly service and maintenance intervals.

5. Fuel Gauge-Indicates the amount of diesel fuel remaining in the tank. The gauge is activated when the key switch is in the "ON" or "HEAT" positions. It will register empty with the key switch in the "STOP" position.

6. Flasher Warning Lights-Operate when the flasher switch is turned on, regardless of the key switch position. Use the flasher warning lights.

7. Flasher Turn Lights-Operate when the turn signal switch is activated. Rotate the switch to the right for right turns, the right arrow will flash. Rotate the switch to the left for left turns, the left arrow will flash. The key switch has to be in the "RUN" position.

8. Temperature Gauge-Indicates coolant temperature. It is activated when the key switch is turned to the "ON" or "HEAT" positions. The gauge will register cold with the key switch in the "STOP" position. If the needle registers in the green range of the gauge, this indicates a normal operating temperature. If the needle moves to the red portion of the gauge, this indicates an overheated condition. Stop the tractor engine immediately and investigate the cause.

9. Tachometer-Registers engine RPM (Revolutions Per Minute). The gauge is marked in increments of 100 and will return to zero when the engine is not running.

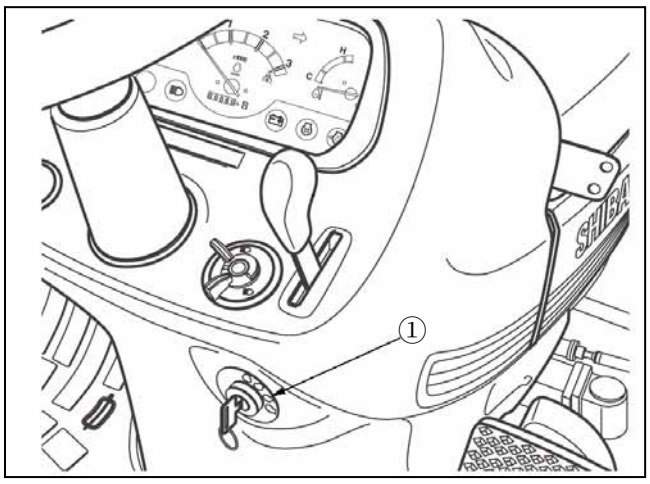
10. Rear PTO Speed-Determined by the position of the needle on the tachometer. The tachometer is marked to indicate 540 PTO RPM. Engine RPM should remain close to this mark while using the rear PTO; running the engine faster than this results in a dangerous overspeed condition.

11. High Beam Indicator – Illuminates when the, head-lights are switched to main beam.

12. Parking Brake Light – Illuminates if the parking brake is engaged when the key switch is turned from "OFF" position.

KEY SWITCH

The key switch ① is located on the right-hand side of the console, just below the hand throttle. Turning the key clockwise, to the "ON" position, activates the warning lights and instruments. The pre-heat system is activated when the key is turned farther clockwise to the "HEAT" position, and the engine starts when the key is turned to the extreme right. The key spring returns to the "ON" position when released.



PRE-HEATING THE SYSTEM

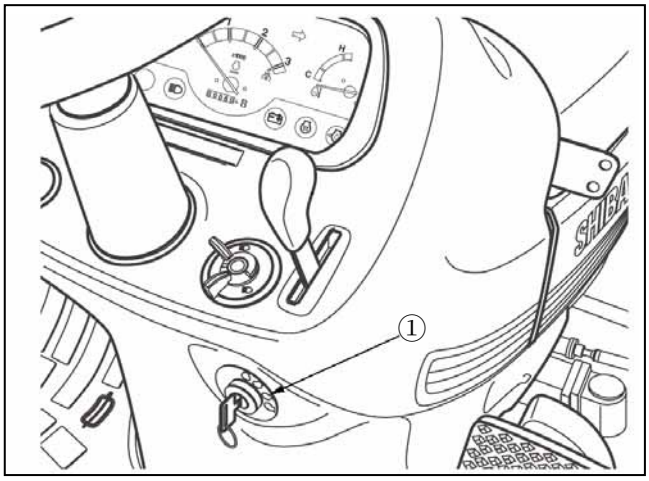
Your tractor has a diesel engine. Before starting a cold engine, the precombustion chambers must be heated.

To pre-heat the engine, turn the key switch to the "HEAT" position and hold the key in this position for approximately 5 seconds. The glow plugs heat the precombustion chambers during this time, and the engine will start.

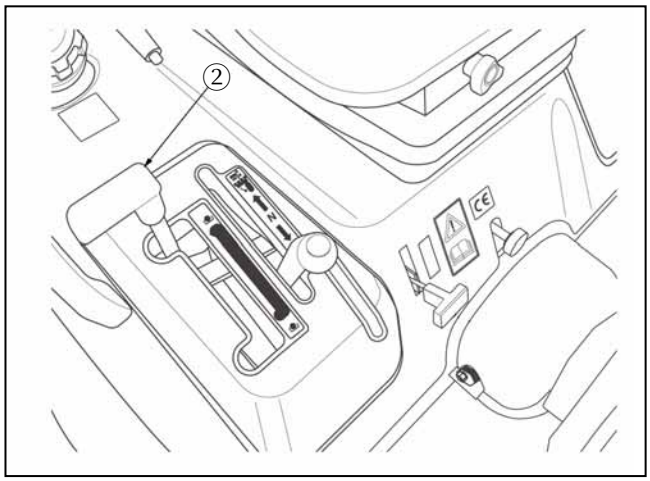
NOTE: *When ambient temperatures are colder, a longer pre-heat time is necessary. Even after the cold start indicator light has gone out, the glow plugs will continue to heat if the key is held in the "HEAT" position.*

STARTING THE ENGINE

The key switch ① allows activation of the starter motor and fuel delivery only when:

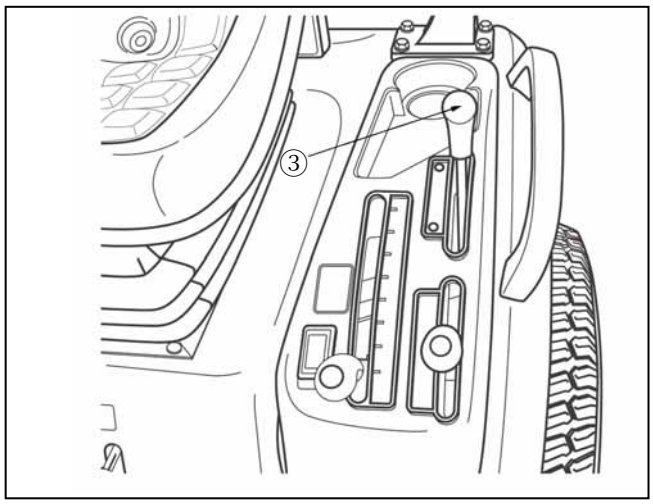


1. The PTO clutch lever ② is in the "disengaged" position.



2. The range lever ③ is in the "NEUTRAL" position.

3. The operator is sitting in the seat **OR** the parking brake is engaged.



NOTE: *Always use safe practices when starting your tractor. Turn the key to the extreme right. Position the hand throttle forward so that it is one-fourth to one-third open.*

⚠ WARNING ⚠

Always sit in the operator's seat when starting the tractor. Never attempt to start the engine while standing beside the tractor.

IMPORTANT: *Do not engage the starting motor continuously for more than 30 seconds. Doing so may cause starting motor failure.*

STARTING THE TRACTOR WITH JUMPER CABLES

⚠ WARNING ⚠

Start the engine only from the operator's seat. If safety start switches are bypassed, the engine can start with the transmission and/or PTO in gear.

If you must use jumper cables to start the tractor:

1. Shield your eyes.

2. Connect one end of the jumper cable to the tractor battery positive (+) terminal and the other to the auxiliary battery positive (+) terminal. Next, connect one end of the other jumper cable first to the auxiliary battery negative (-) terminal, then the other end to the tractor starter ground terminal. Finally, start the tractor by following the safe starting procedures outlined under "Starting the Engine." Idle the engine and turn on all electrical equipment (lights, etc.), then disconnect the jumper cables in the reverse order in which they were connected. This helps protect the alternator from damage due to extreme load changes.

⚠ WARNING ⚠

Batteries contain sulfuric acid and produce explosive gases. To prevent personal injury:

- **Wear eye and skin protection.**
- **Keep sparks and flame away.**
- **Ensure there is adequate ventilation while charging or using the battery.**
- **Follow the manufacturer's instructions found on the battery.**

STOPPING THE ENGINE

Turn the key switch to the "OFF" position to stop the engine.

BREAK-IN PROCEDURES

Your SHIBAURA tractor will provide long and dependable service if given proper care during the first 50-hour break-in period. During the first 50 hours of operation:

1. Avoid "lugging" the engine. Operating in too high a gear under heavy load may cause engine lugging, which is indicated when the engine will not respond to a throttle increase.

2. Use the lower gear ratios when pulling heavy loads and avoid continuous operation at constant engine speeds. You will save fuel and minimize engine wear by selecting the correct gear ratio for a particular operation. Operating the tractor in low gear with a light load and high engine speed wastes fuel.

3. Avoid prolonged operation at either high or low engine speeds without a load on the engine.

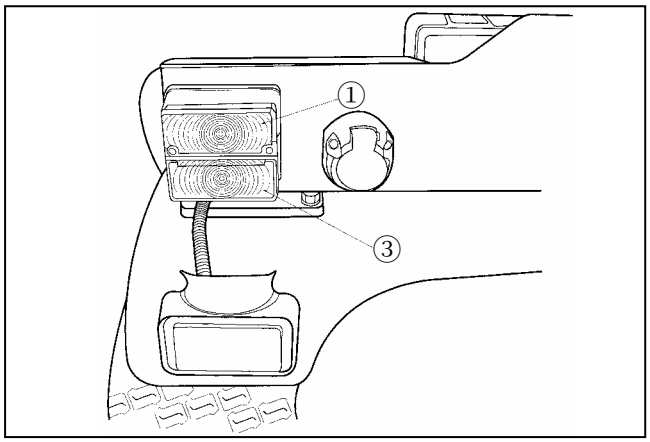
4. Check the instruments frequently and keep the radiator and oil reservoirs filled to recommended levels. Daily checks include the engine oil level, radiator coolant, and air cleaner.

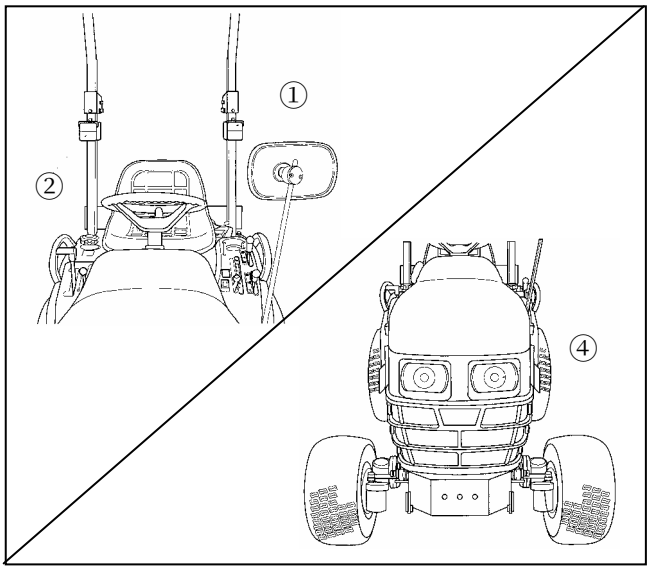
5. After the first 50 hours of use, be sure to perform the maintenance items listed in the maintenance schedule.

LIGHTING

Your tractor equipped with:

- Flasher warning lights, (Turn Signals) ①.
- Side and Tail Light ② ③.
- Headlights ④.





Headlights and Side and Taillights

The headlights ④ and the side and taillights ② ③ are controlled by the rotary selector ⑤ switch located between the steering column and the manual throttle lever, on the RH side of the dash board. The lower switch controls the lower pair of headlights and the side and taillights; its three positions are:

A Left- all lights OFF

B Center- instrument panel and side lights, taillights ON

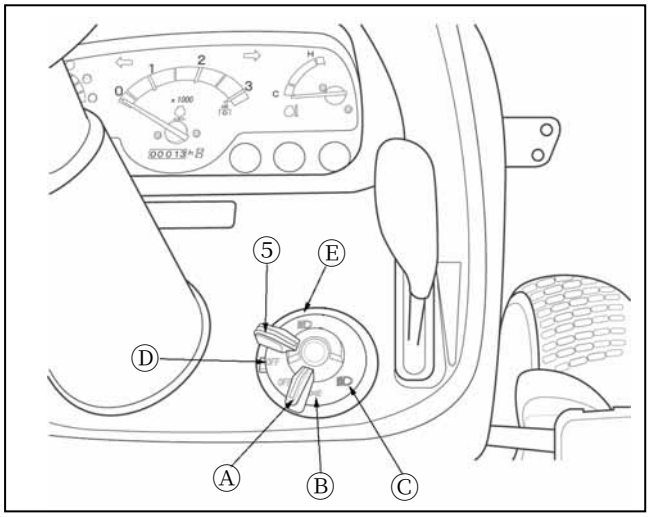
C Right- instruments, side lights taillights, and headlights (low-beam) ON.

The upper switch lever controls the upper pair of headlights (high-beams) ONLY; its two positions are:

D Lower- OFF

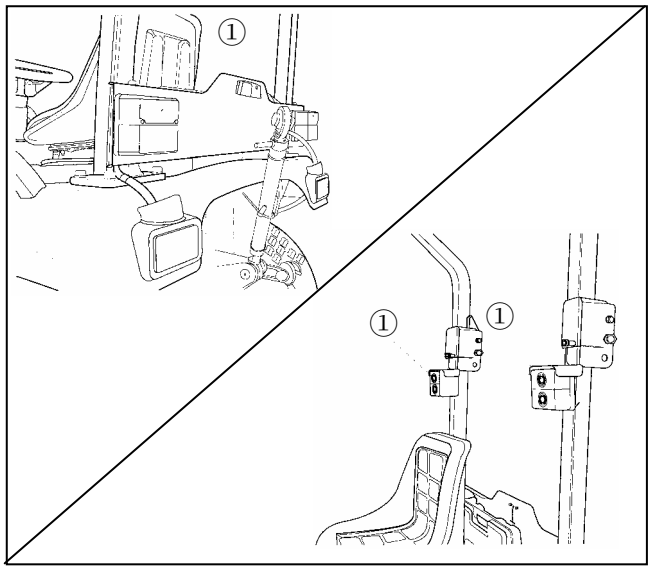
E Upper- ON

NOTE: *The ignition key must be in the "ON" position for the lights to operate.*



Flasher Warning Lights

The four flasher warning lights ① are controlled by the upper switch lever ③ on the rotary selector switch ② located to the left of the steering column. Move the switch lever clockwise to turn the flashers ON. Return the switch lever counterclockwise to turn the flashers OFF.

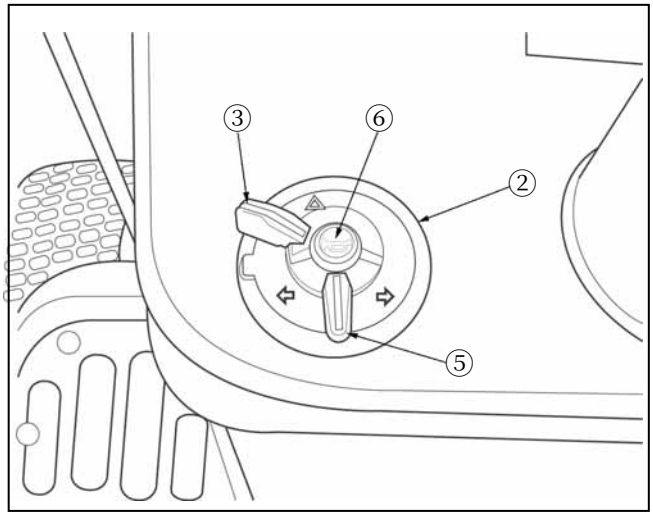


Flasher Turn Lights (Turn Signals)

The turn signal lights are controlled by the lower switch lever ⑤ on the rotary selector switch ② located to the left of the steering column. Move the switch lever to the right to indicate right turns, and to the left for left turns. (The ignition key must be in the "ACC/RUN" position for the turn signals to operate.)

When signaling a turn, the designated turn side amber light will flash, and the opposite side amber light will illuminate continuously.

NOTE: *If the turn signal is actuated while the flasher warning (Hazard) lights are operating, the amber light on the side opposite the turning direction will stop flashing and illuminate continuously.*

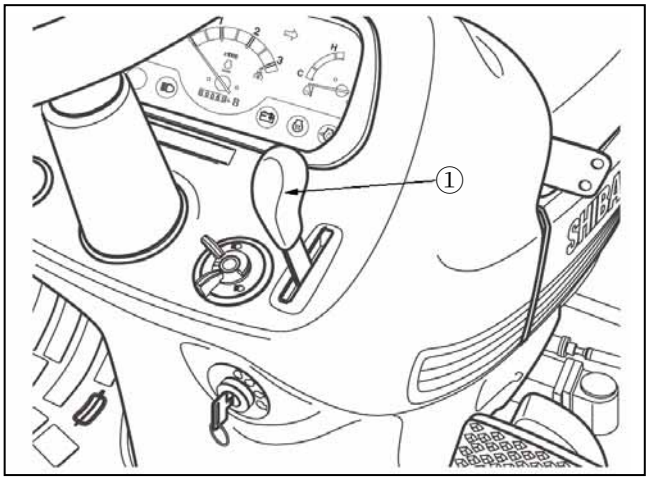


Horn

To activate the horn, push in on center button ⑥. Horn can be activated with the key switch in any position.

THROTTLE CONTROLS

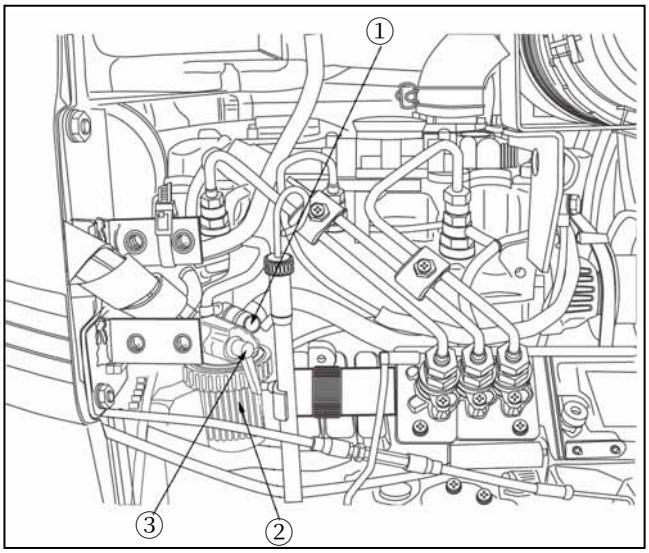
The hand throttle ① is located on the RH side of the console. Push the throttle forward to increase the engine RPM, Pull the throttle rearward to decrease the RPM.



FUEL SHUTOFF VALVE

The fuel shutoff valve ① is located in the fuel line, on top of the fuel filter ②. The fuel filter is accessed from the RH side of the tractor.

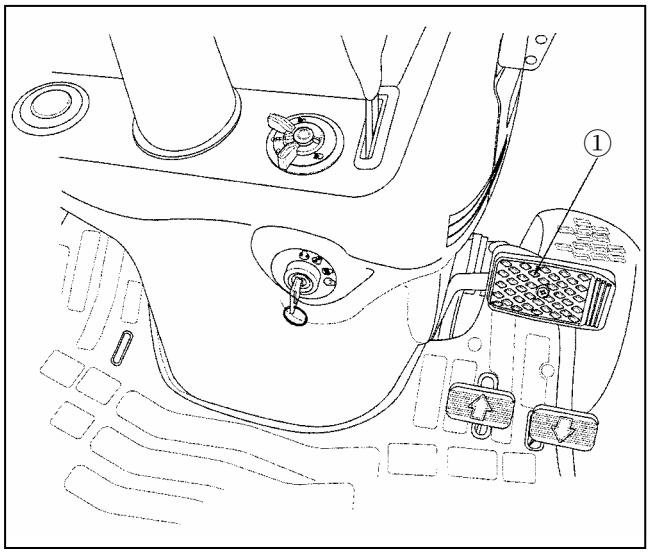
To open the fuel shutoff valve, rotate the handle ③ until it points straight up and down. To close the valve, rotate the handle clockwise to the horizontal position. Always close the fuel shutoff valve when servicing any part of the fuel system.



BRAKE CONTROLS

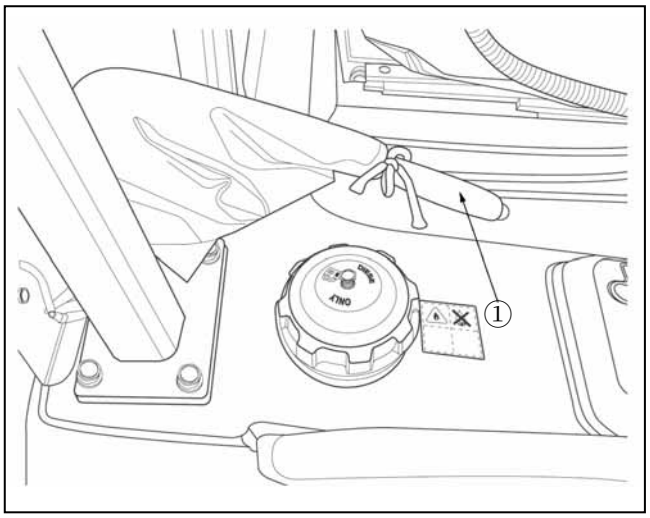
Brake Pedal

The brake pedal ① located on the RH side of the tractor, controls the braking action of the rear wheels. There are no separate left and right brakes on this model tractor.



PARKING BRAKE CONTROL

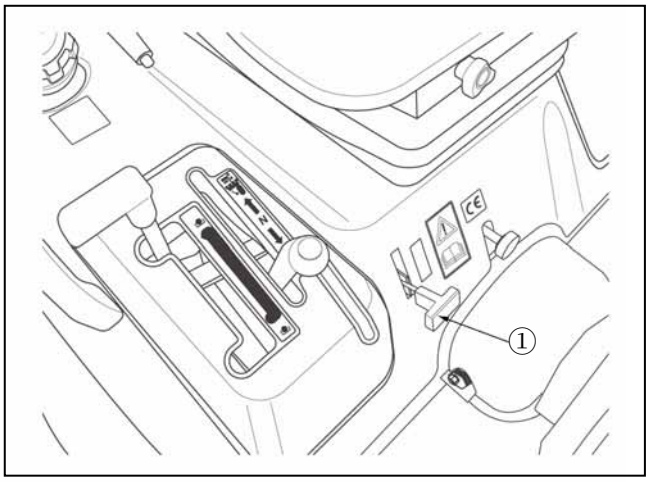
The parking brake ① is used for locking the brake pedals in the applied position.
The parking brake should be applied whenever the tractor is parked.



FRONT-WHEEL DRIVE

The front-wheel drive option is controlled by a lever ① located below the front of the seat, on the RH side.

To engage the full-time front-wheel drive, pull the lever fully upward. To disengage the front-wheel drive, push the lever fully downward.

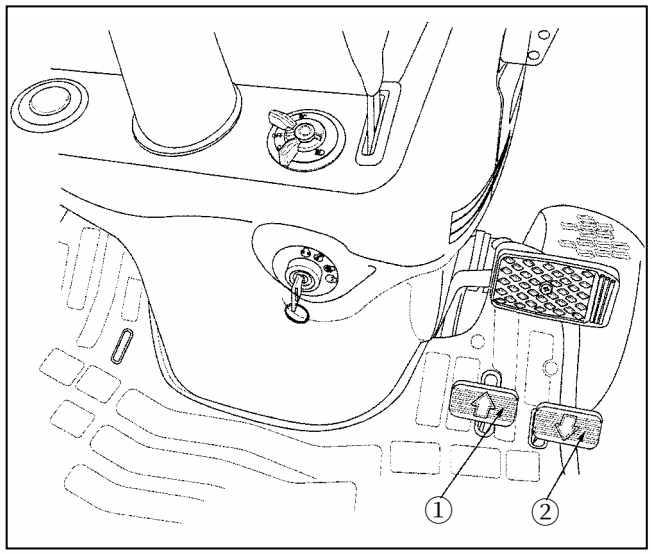


HYDROSTATIC TRANSMISSION (H.S.T.) MODEL

H.S.T. FOOT PEDAL

The ground speed of tractors equipped with a hydrostatic transmission is continuously variable, from zero to full rated speed in each range. Speed is controlled by the H.S.T. forward ① and reverse ② pedals, located on the RH side of the foot platform.

For forward travel, depress the forward pedal until the desired ground speed is reached. For reverse travel, depress the reverse pedal. The transmission returns to neutral and the tractor stops when either pedal is released.



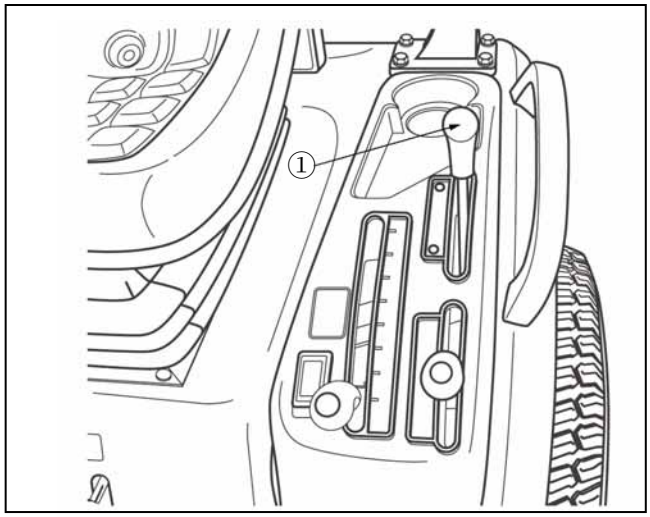
H.S.T. RANGE LEVER

The range selector lever ① is located on the LH control pod. It has two speed ranges (H-high and L-low) and one neutral (N) position.

NOTE: *The range selector lever must be in the neutral position to activate the safety start system and allow the engine to start.*

To select the desired operating range, the H.S.T. pedals must both be in their neutral positions.

IMPORTANT: *Never attempt to engage or disengage the range lever when the tractor is in motion.*



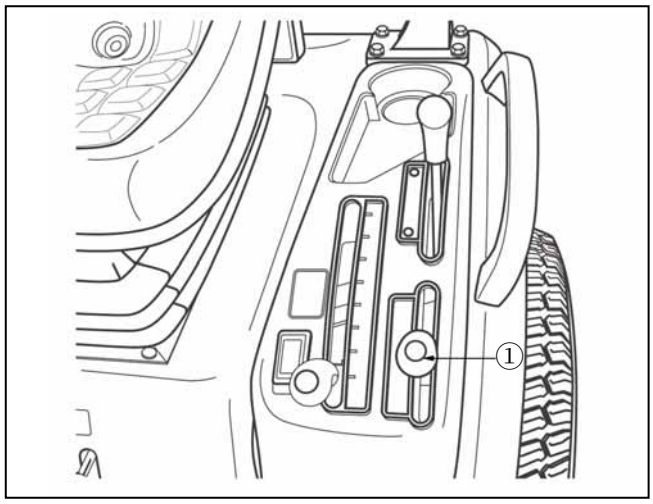
PTO LEVER CONTROL

The PTO Selector lever ① is located on the LH control pod, outboard of the mower height adjustment lever. The selector lever allows the operator engage one of the following three PTO positions:

Rear position - Rear PTO ONLY engaged

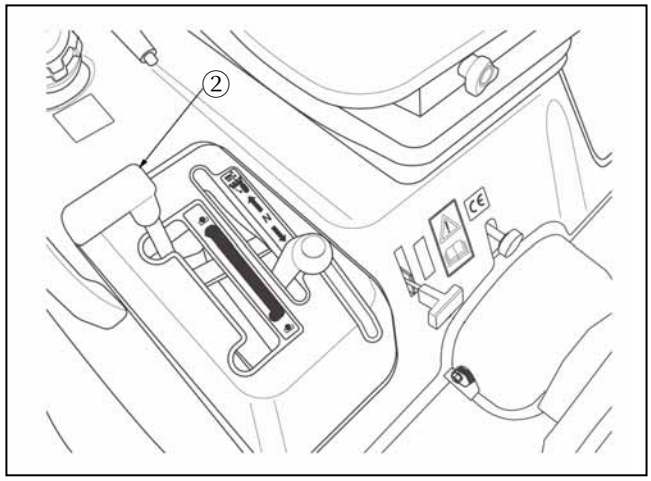
Center position - Rear AND Mid PTO engaged

Forward position - Mid PTO ONLY engaged



The PTO Clutch lever ② is located on the RH control pod, outboard of the rear hitch control lever. To engage the selected PTO(s), move the PTO clutch lever to the left, fully forward then to the right. To disengage the PTO clutch, move the lever to the left and then fully rearward.

To engage PTO, place PTO selector lever ① into the desired location, then shift the PTO clutch lever ② into the engaged position.



NOTE: *The PTO clutch must be disengaged to change the PTO selection. The clutch must also be disengaged to start the tractor engine.*

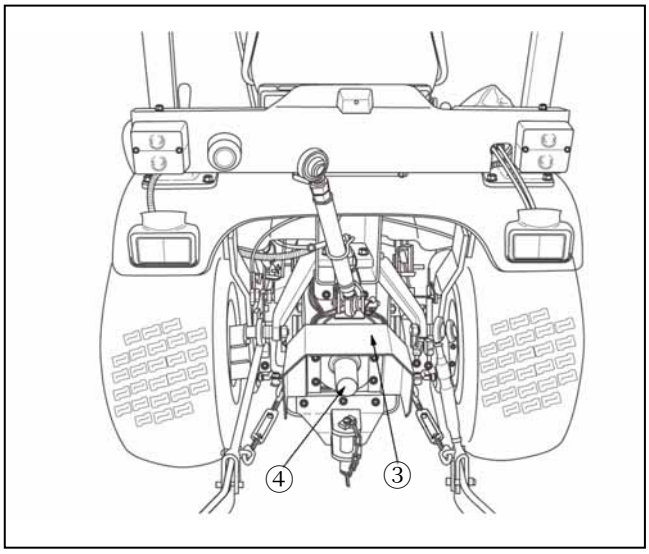
IMPORTANT: *Most PTO equipment is designed to operate most efficiently at 540 ±10 RPM. The tachometer has a mark which indicates the correct engine RPM for 540 RPM PTO operation. Operating equipment faster than this decreases efficiency, and may be dangerous.*

PTO SHIELD AND CAP

The PTO shield ③ and cap ④ are standard equipment.

Use the PTO shield with both mounted and pull-type equipment. The shield rotates upward, allowing for easy implement attachment to the PTO stub shaft.

The PTO cap should always be installed when the PTO is not in use.



OPERATION OF THE POWER TAKE-OFF (PTO)

1. Before attaching either mid or rear PTO, stop the tractor engine.

NOTE: *To rotate the rear PTO with engine not running, the PTO selector lever must be in the mid PTO position only.*

⚠ WARNING ⚠

To reduce the possibility of personal injury, comply with the following guidelines before attaching or detaching PTO equipment, and before working on or clearing PTO equipment.

- **Remove pressure from the H.S.T. forward/reverse speed pedals, and move the transmission range lever into the "NEUTRAL" (N) position.**
- **Set the parking brake.**
- **Disengage the PTO using the PTO clutch lever.**
- **Remove the PTO cap.**
- **Wait until the PTO shaft stops turning.**
- **Attach the mounted or drawn equipment. Ensure that the equipment-driven shaft is properly aligned and locked to the tractor PTO driveshaft, and that the PTO shield is lowered into the guarded position.**

2. With the PTO disengaged, start the engine. For mounted equipment, raise and lower the equipment to ensure there are proper clearances for operation.
3. With the transmission range lever still in neutral (N), move the PTO selector to the desired position.

IMPORTANT: *The PTO may be damaged if the PTO selector lever is not fully moved to the selected positions.*

4. Engage the selected PTO by moving the PTO clutch lever to the right and fully forward.
5. Check the PTO-driven equipment for proper operation by gradually increasing the engine RPM with the manual throttle control.
6. If the equipment is operating properly, shift the transmission range lever from neutral into the desired speed range.
7. Gradually apply pressure to the H.S.T. forward speed pedal, to start the PTO and tractor in motion.
8. Control the PTO speed using the throttle. Never operate in an overspeed condition.
9. When making sharp turns with towed equipment, or with mounted equipment in the fully raised position, disengage the rear PTO using the PTO clutch lever.
10. When travelling on highways or for any great distance, disconnect the PTO-driven shaft at the tractor PTO shaft.
11. Reinstall the PTO shaft cap whenever PTO-driven equipment is disconnected from the tractor, or when the PTO is not being used.

⚠ WARNING ⚠

To avoid inadvertent movement of PTO implement, disengage the PTO after each use.

REAR PTO OPERATION (WITHOUT OPERATOR IN SEAT)

To operate the rear PTO without the operator being in the seat, the following operations must be performed:

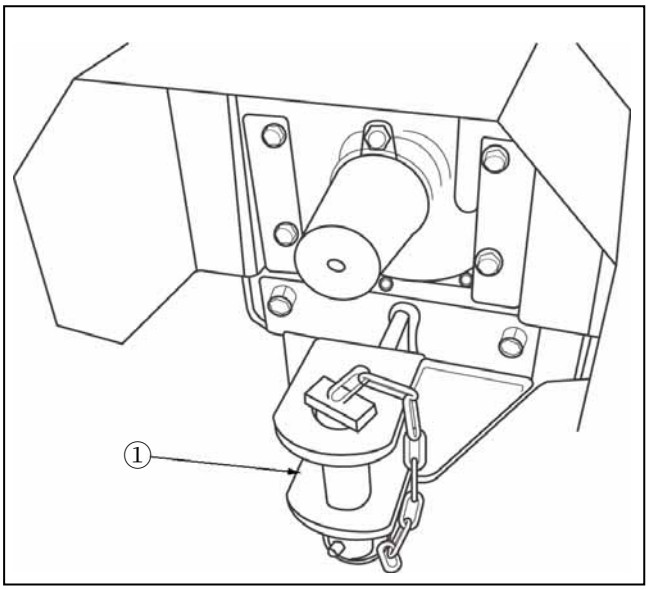
- Transmission range lever in NEUTRAL position
- Parking brake in "ON" position
- PTO Selector lever in "Rear PTO (ONLY)" position

NOTE: *The Mid PTO must be operated with an operator present in the seat.*

FIXED/CLEVIS DRAWBAR

Your tractor is equipped with a fixed drawbar ① for towing equipment behind the tractor.

IMPORTANT: *When transporting equipment on highways, a safety chain with a tensile strength equal to the gross weight of the implement should always be installed between the tractor and the implement hitch.*

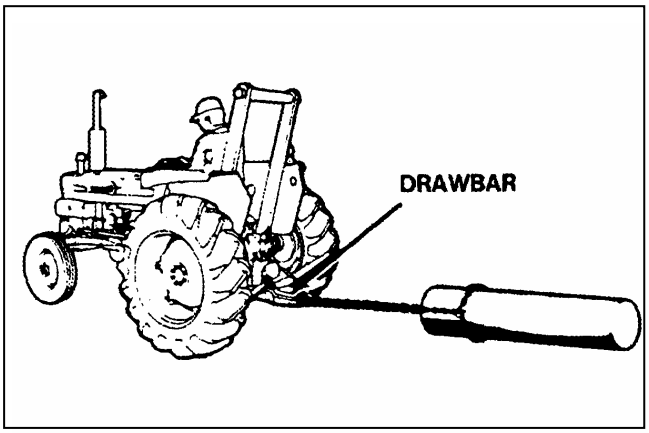


⚠ WARNING ⚠

Pull only from the drawbar. Always use the drawbar, or the lower links in the lowered position, when performing pull-type work.

TOWING THE TRACTOR

Place the transmission range lever in neutral, and disengage the PTO clutch lever, to tow the tractor. Do not exceed 16 KPH.



⚠ WARNING ⚠

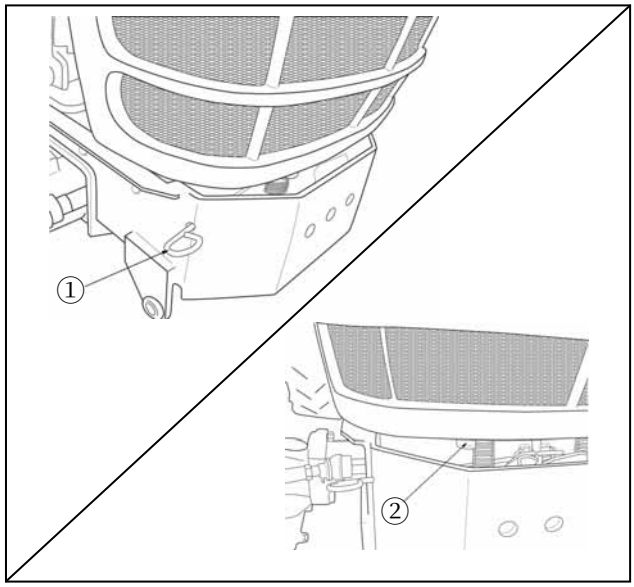
For-safety reasons, NEVER attempt to start the engine by towing. Additionally, towing the tractor on highways is NOT recommended, for safety reasons.

HOOD LATCH

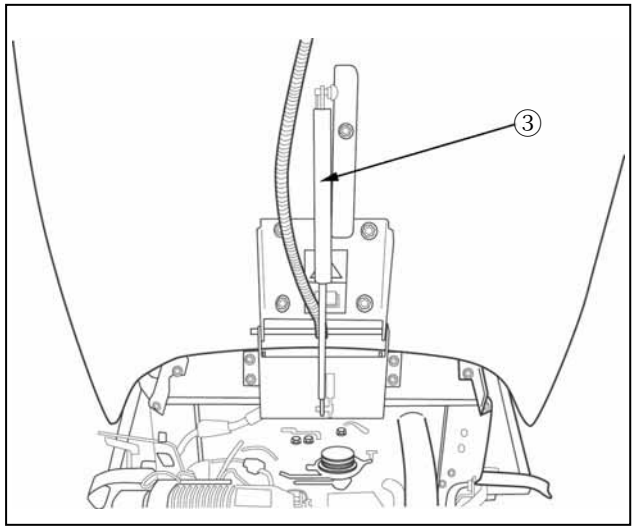
As viewed from the front of tractor:

1. To raise the food, pull the latch release ① to the left and move safety catch ② upward. A gas spring ③ assists in lifting the hood, and holding it in its raised position.

2. To lower the hood, push downward against the resistance of the gas spring, until the hood engages the latch mechanism.



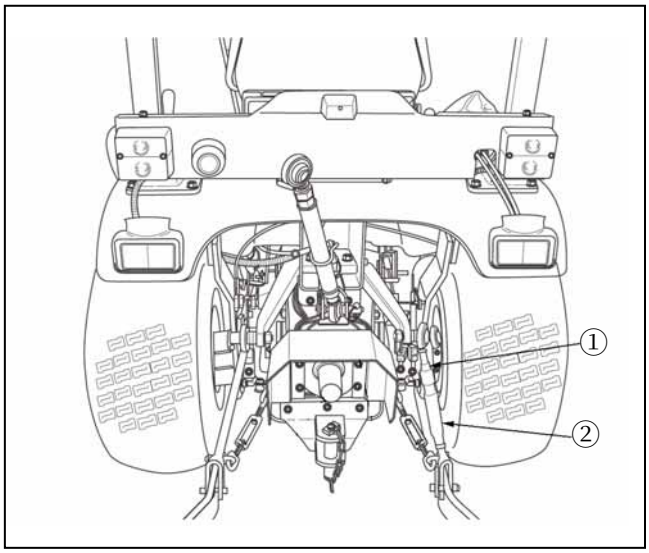
NOTE: *Keep the latch mechanism free of dirt and debris, so the latch will operate properly.*



THREE-POINT LINKAGE

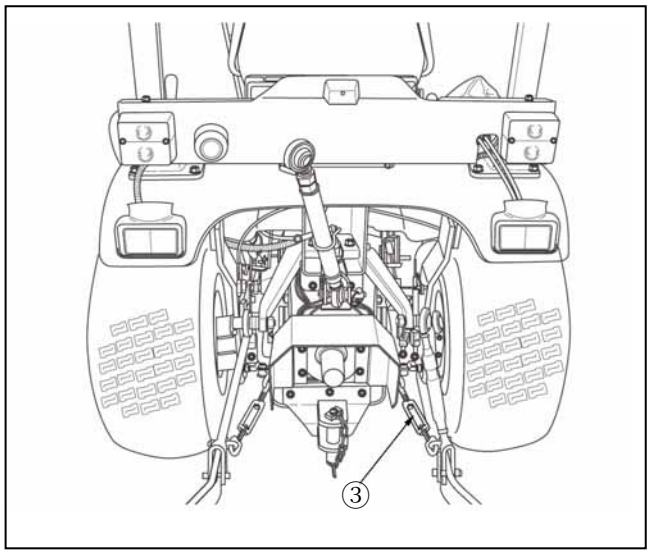
The tractor's three-point linkage is used to attach three-point mounted equipment which is usually PTO-operated, such as rotary mowers, tillers, flail mowers, snowblowers, etc. The three linkage points are the two lower lift arms and the top link.

The height of the RH lift arm and the top link can also be adjusted, by loosening the jam nut ① turning the adjustment turnbuckle ② and re-tightening the jam nut.



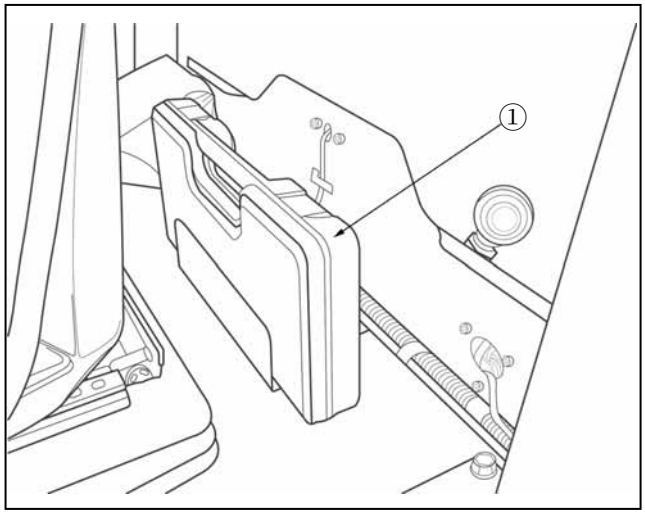
The standard three-point linkage has easily-adjustable sway bars ③ to control the lateral movement of the lift arms.

NOTE: *Cycle the three point linkage through the entire travel and check for any interference with rear tires. If interference is present, adjust sway bars as needed.*



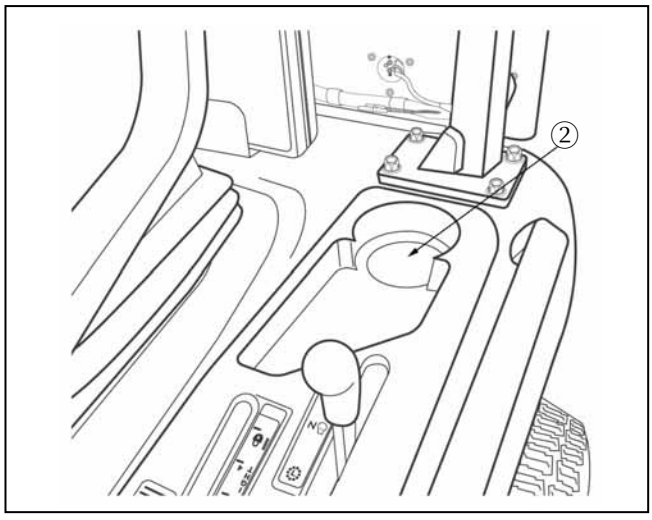
TOOL BOX

A tool box ① with a latching lid, is located behind the seat and between the ROPS uprights.



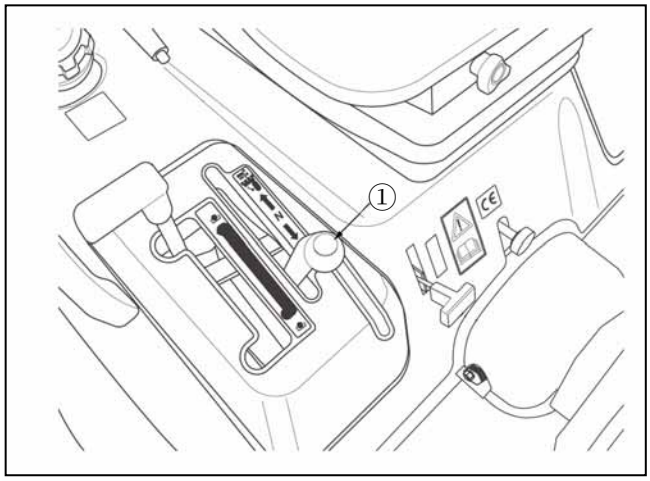
DRINK HOLDER

A drink holder ② is attached to the left fender, for the operator's drink storage convenience.



TRACTOR HYDRAULICS

HYDRAULIC POWER LIFT (H.P.L.) (3 PT)



The H.P.L. lever ① is located on the RH control pod, inboard of the PTO clutch lever. This lever controls the position of the two lift arms.

Operating the hydraulic control lever actuates the hydraulic lift arms, which controls the elevation of 3-point hitch mounted implement.

To lower implement, move the hydraulic control lever forward.

To raise implement, move the hydraulic control lever rearward.

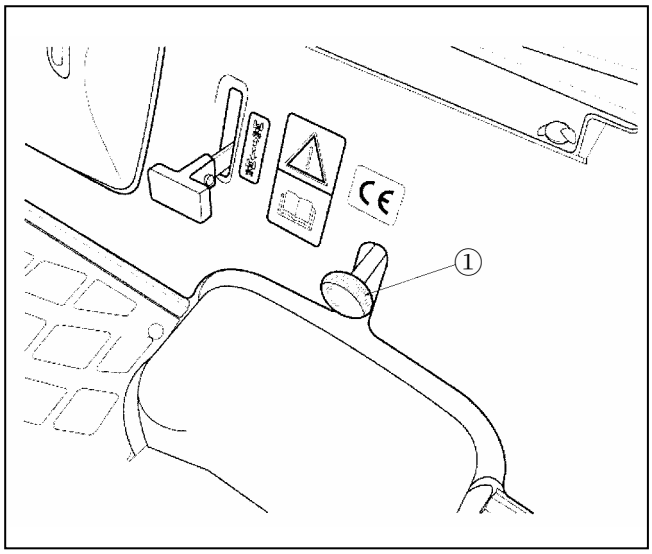
The hydraulic control lever is automatically returned to the neutral position ONLY when the lift arms have reached the upper position.

IMPORTANT: *While raising or lowering the lift arms the hydraulic control lever must be manually placed in the neutral position to stop the travel of the lift arms.*

⚠ WARNING ⚠

Make sure the area is clear of people before lowering equipment.

DROP RATE VALVE

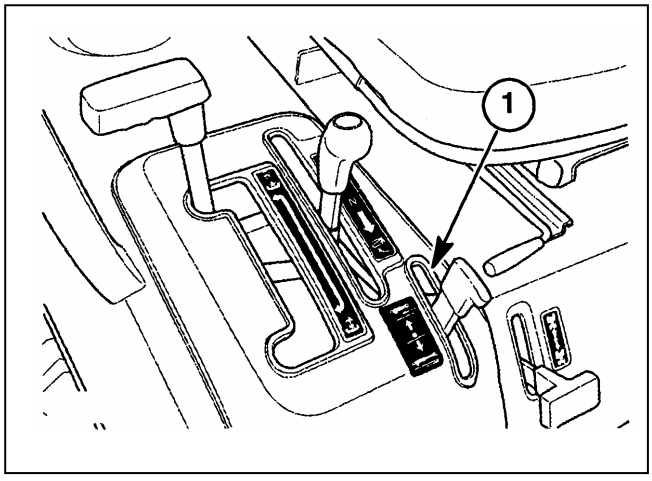


The drop rate valve provides an adjustment to regulate the flow of oil from the lift cylinder. This allows the operator to decrease or increase the rate of drop of the lower links. On this tractor model, the drop rate control knob ① is located directly below the front of the seat.

Turn the flow control valve "IN" (clockwise) to decrease the rate of drop. Turn the valve "OUT" (counterclockwise) to increase the rate of drop.

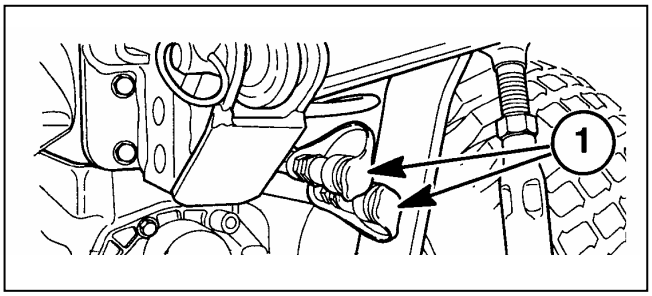
The flow control valve must be opened before the hydraulic lift control will lower. If the valve is turned all the way "IN" (clockwise), the lower links can be raised to maximum height, but cannot be lowered.

REAR REMOTE CONTROL VALVE (OPTIONAL)



Your SHIBAURA tractor can be equipped with one auxiliary valve. If so equipped, the control lever is located on the RH control pod ① inboard of the hitch control lever.

To operate the single-spool valve, pull the control lever rearward to extend the cylinder. Push the control lever forward to retract the cylinder. Release the control lever to stop the cylinder in any position before it is fully extended. The lever automatically returns to neutral.



The auxiliary valve can be fitted with either rear 3/8" quick couplers ①.

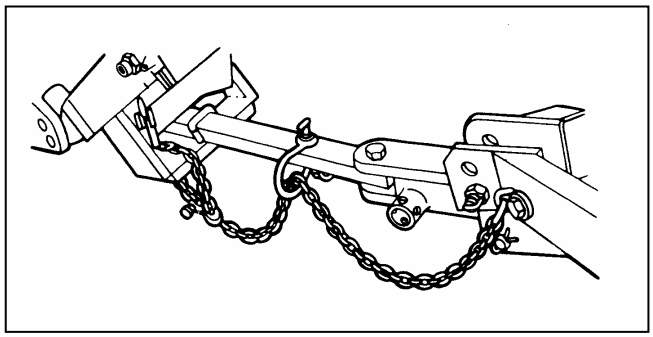
DRIVING THE TRACTOR

⚠ WARNING ⚠

Observe the following precautions when driving the tractor.

- Watch where you are going—especially at row ends, on roads, and around trees.
- Keep the tractor in gear when going down hill. Use a low gear to maintain control with minimum braking.
- If the tractor is stuck, back out to prevent upsetting the unit.
- Always use the drawbar for pull-type work. Do not pull from any other part of the tractor, especially ROPS since it may tip backward.
- Keep the lights adjusted so they do not blind the operator of an oncoming vehicle.
- Press the H.S.T. pedal slowly when driving out of a ditch, gully, or up a steep hillside. Immediately release the forward speed pedal if the front wheels should rise off the ground.
- Reduce speed before turning quickly or applying the brakes. Brake both wheels simultaneously when making an emergency stop.
- Never apply the differential lock when turning.
- Use extreme caution and avoid hard applications of the tractor brakes when pulling heavy towed loads at road speeds.
- Always sit in the driver's seat while starting or driving the tractor.
- Any towed vehicle whose total weight exceeds that of the towing tractor must be equipped with brakes for safe operation.
- Always check overhead clearance, especially when transporting the tractor.

IMPORTANT: *When transporting on the highway, it is recommended that a safety chain with tensile strength equal to the gross weight of the implement be connected between the tractor and the towed implement. This will control the implement in the event the hitch pin is lost.*



NOTE: *Attaching hardware will need to be procured locally. Check implement assembly or operators manual for attaching hardware specifications, such as bolt size and grade, chain strength, washers, lock-washer, nuts, etc.*

After attaching the safety chain, make a trial run by driving the tractor to the right and to the left for a short distance to check the safety chain adjustment. If necessary, readjust to eliminate tight or loose chain. Safety chains and suitable hardware are available from your SHIBAURA Tractor Dealer

WHEEL TREAD SETTINGS

NOTE: Tread settings are measured from center of tire to center of tire.

Front Wheel Settings

Tire Type	Tractor Model	Setting	Note
BAR 18 x 8.50 – 8	Front-Wheel Drive	940 mm	Not Adjustable
Turf 18 x 8.50 - 8	Front-Wheel Drive	940 mm	Not Adjustable
Agricultural 4.00 – 9	Front-Wheel Drive	910 mm	Not Adjustable

IMPORTANT: *Never attempt to widen the tread setting by reversing the front wheels on a front-wheel drive system.*

NOTE: *Torque front wheel bolts to 88 N·m.*

Rear Wheel Settings

Tire Type	Tractor Model	Setting	Note
BAR 26 x 12.00 – 12	Front-Wheel Drive	870 mm	Not adjustable
Turf 26 x 12.00 – 12	Front-Wheel Drive	870 mm	Not Adjustable
Agricultural 7 – 14	Front-Wheel Drive	910 mm	Not Adjustable

Note: *Torque rear wheel bolts to 122 N·m.*

TRACTOR WEIGHTING

For sufficient traction and maximum performance in heavy draft operations, and to counterbalance rear-mounted equipment, weight should be added to tractor in the form of liquid ballast, cast iron weights or a combination of both. Only enough weight should be added to provide good traction and stability. Adding more weight than is needed results unnecessary soil compaction, increased rolling resistance, and higher fuel consumption.

NOTE: *When adding weight to the tractor, tire pressures may need to be increased. Refer to the Tire Inflation Pressure chart found in this manual.*

WEIGHTING FOR STABILITY

Front end ballast may be required for stability and steering control when weight is transferred from the front wheels to the rear wheels as an implement is raised by the tractor three-point hitch.

As a general guide:

Ballast the tractor (less implement) so that approximately one-third of the tractor weight is on the front wheels. For optimum traction, tractors equipped with front-wheel drive should be ballasted so that 40-45% of machine weight is on the front wheels.

When a mounted implement is raised to the transport position, the front wheel reaction should be at least 20% of tractor weight.

Add additional front end ballast as required for stability during operation and transport. Tractor front end ballast may not always maintain satisfactory stability if the tractor is operated at high speed on rough terrain. Reduce tractor speed and exercise caution under these conditions.

When using front-mounted equipment, add weight to the rear axle of the tractor to maintain good traction and stability. Front-mounted equipment varies in weight. Refer to equipment manual for ballasting.

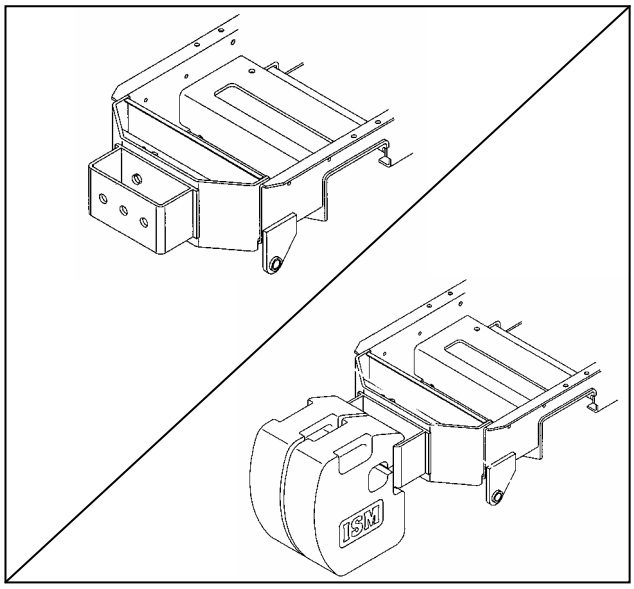
WEIGHTING LIMITATIONS

The weighting limitations that follow are limitations only. They do not imply that the tractor should be weighted to attain the weights given. Use only enough weight to obtain good performance.

CAST IRON WEIGHTS (OPTIONAL)

Cast iron weights are available as accessories from your SHIBAURA Dealer. Weights can be mounted on the front end of the tractor and on the rearmost wheels.

NOTE: *Front weight bracket 370220230, 372111070 is required to install front weights.*



Front End Weights

Tire Type	Weight(s)
Agricultural and Turf	Maximum of (2) weights per tractor @ 30 kg each 60 kg total

LIQUID BALLAST (OPTIONAL)

It is a common practice to add weight to the tractor by filling rear tires with liquid. A calcium chloride ($CaCl_2$) and water solution is recommended due to its low freezing point and greater density (weight per gallon) than pure water.

Never exceed the total recommended weight for the tractor. Because special equipment is required to fill the tires, consult your SHIBAURA Dealer.

Tires should never be filled beyond 75%. At 75% full, the liquid will come to the valve stem when the valve stem is at its highest point at the top of the wheel.

TIRE PRESSURE

Tire pressure must be considered when adding weights, implements, or attachments to the tractor or damage to the tractor may occur.

The chart below outlines tire inflation pressures.

FRONT TIRE INFLATION PRESSURES		
Tire Type	**Tire Size**	**Inflation Pressure**
BAR:	18 x 8.50 – 8	60 – 140 kPa
Turf:	18 x 8.50 – 8	60 – 140 kPa
AG:	4.00 – 9	120 – 240 kPa
REAR TIRE INFLATION PRESSURES		
Tire Type	**Tire Size**	**Inflation Pressure**
BAR:	26 x 12.00 – 12	80 – 140 kPa
Turf:	26 x 12.00 – 12	80 – 140 kPa
AG:	7 – 14	120 – 180 kPa

NOTE: *Do not underinflate or overinflate tires. Do not exceed maximum inflation pressure listed.*

SECTION 3
LUBRICATION AND MAINTENANCE

Adequate lubrication and maintenance on a regular schedule is vital to maintaining your equipment. To ensure long service and efficient operation, follow he lubrication and maintenance schedules outlined in this manual. The use of proper fuels, oils, grease and filters, as well as keeping the systems clean, will also extend machine and component life.

IMPORTANT: *Always use genuine SHIBAURA replacement parts, oils and filters to ensure proper operation, filtration of engine and hydraulic systems. See your SHIBAURA dealer for additional oil quantities.*

GENERAL INFORMATION

Regular lubrication is the best insurance against delays and repairs. Proper lubrication will extend machine life. Refer to the following charts for lubricants and service intervals.

IMPORTANT: *Failure to complete the required maintenance at the recommended intervals can cause unnecessary downtime.*

The intervals listed in the Lubrication Chart are guidelines to be used when operating in normal conditions. Adjust the intervals for operating in adverse environmental and working conditions. The intervals should be shortened for sandy, dusty and extremely hot operating conditions.

⚠ CAUTION ⚠

Observe these safety precautions before performing lubrication and maintenance.

1. **Shut off engine.**
2. **Disengage all drives.**
3. **Lower all attachments to the ground or raise and engage all locks**
4. **Close all shields opened and reinstall any shields removed for lubrication and maintenance proposes.**

⚠ CAUTION ⚠

Some illustrations in this manual show shields opened or removed to show areas being serviced. Replace all shields before operating this machine.

Always clean the area around dipsticks, fill caps, and check plugs when checking fluid levels. Failure to clean these areas may allow contamination to enter the system. Drain, flush and refill the system anytime you suspect it is contaminated.

Grease Fittings

Wipe dirt from fittings before greasing.

Pump fresh grease into fitting to adequately lubricate the component and force out any contamination from the grease passage.

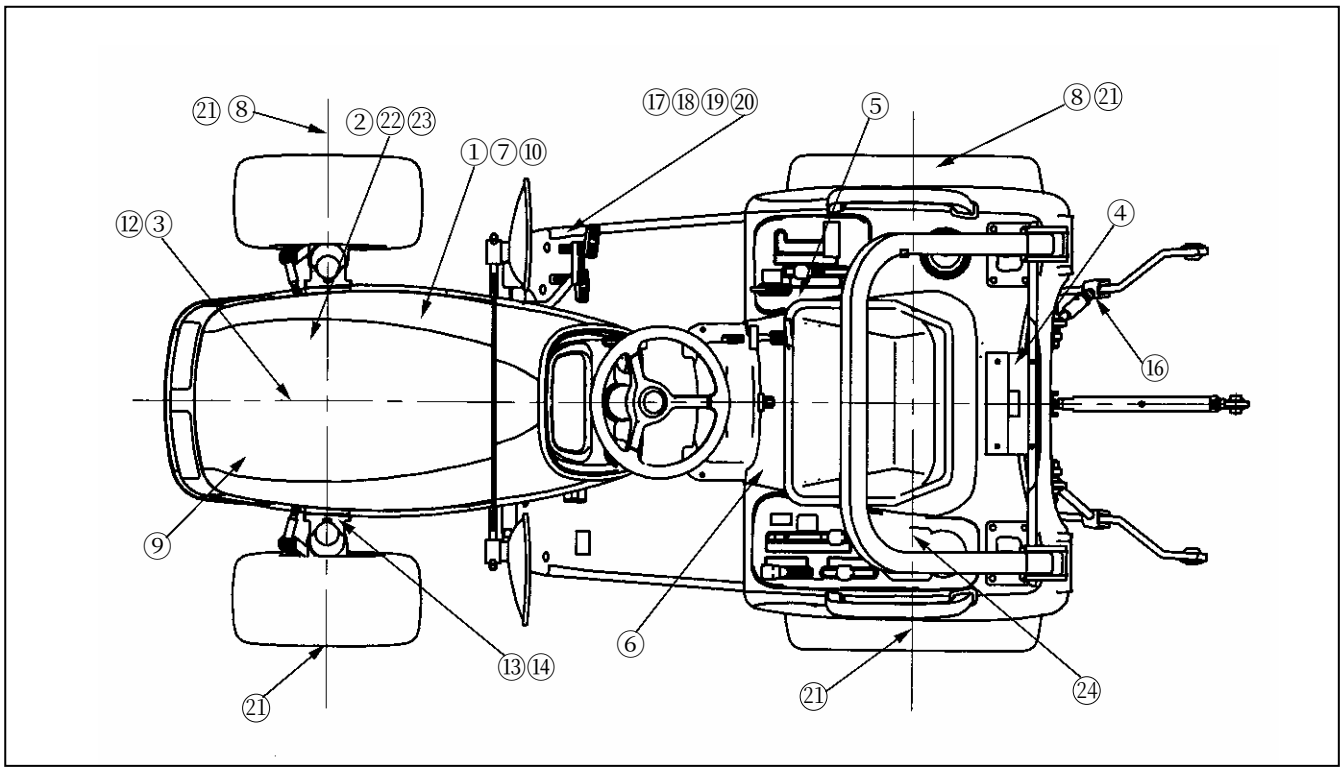
Wipe off excess grease.

Use a grease gun containing clean high grade of multipurpose grease.

Chains

Stop all drives before lubricating chains.

LUBRICATION AND MAINTENANCE CHART
SHIBAURA SX21/SX24 – FRONT-WHEEL DRIVE



NO.	LUBRICATION & MAINTENANCE ITEMS	CHECK	CLEAN	LUBE	CHANGE	ADJUST	SERVICE INTERVALS
1	Engine Oil Level	×					Every 10 Hours or Daily
2	Air Cleaner	×					
3	Radiator Coolant	×					
4	Transmission Oil Level	×					
5	Hydraulic Filter				×		First 50 Hours
6	H.S.T. Filter				×		
1, 7	Engine Oil & Filter				×		
8	Tire Pressure	×					
10	Fuel Filter Element				×		
26	Wheel Bolt Torque	×					
-	All Fluid Levels	×					
8	Tires	×					Every 50 Hours
9	Battery	×					
10	Secondary Fuel Filter	D	R	A	I	N	
12	Fan Belt	×					
13	Front Axle Oil Level	×					
14	Final Reduction Gear Cases Oil Level	×					
	Lubrication Fittings:						
16	3-Point Linkage			×			
17	Brake Pedal			×			
18	Pedal Shaft			×			
19	H.S.T. Pedal Pivot			×			
1, 7	Engine Oil & Filter				×		Every 100 Hours
2	Air Cleaner Element		×				
10	Secondary Fuel Filter		×				

NO.	LUBRICATION & MAINTENANCE ITEMS	CHECK	CLEAN	LUBE	CHANGE	ADJUST	SERVICE INTERVALS
20	Brake					×	Every 200 Hours
10	Fuel Filter Element				×		
12	Fan Belt					×	
21	Wheel Bolt Torque	×					
	Steering Free Play	×				×	
4	Transmission Oil				×		Every 300 Hours
5	Hydraulic Filter				×		
6	H.S.T. Filter				×		
13	Front Axle Oil				×		
14	Final Reduction Gear Cases Oil				×		
24	Primary Fuel Filter				×		
22	Fuel Injector	×				×	Every 600 Hours
23	Valve Clearance	×				×	
2	Air Cleaner				×		Seasonal
3	Radiator Coolant				×		
2	Safety Air Filter Element				×		Every 3rd Primary Element Change or Every **1000** Hours, Whichever Comes First

LUBRICATION FITTINGS

NOTE: *After every 50 hours of normal operation, apply a good quality grease to the lubrication points listed below (refer to the Recommended Lubricants chart). When operating under extremely dirty conditions, lubricate more frequently than every 50 hours.*

- Steering Linkage
- Front Axle Pivot
- Power Steering Cylinder
- Pedal Shaft—Clutch & Brake Pedals
- 3-Point Linkage

To lubricate these points:

1. Wipe away all old grease and dirt from the lubrication fittings to prevent dirt or foreign material from entering as new grease is applied.
2. Use a high pressure grease gun to force in the new grease. Apply pressure until clean grease oozes from each lubrication point.
3. Wipe away any excess grease.

DIESEL FUEL

- Use clean, quality No. 1 -D or No. 2-D fuel (ASTM D975).
- Use No. 1-D fuel if the ambient temperature is expected to be lower than 4°C or if the tractor is to be used at an altitude exceeding 1524 m.
- Use No. 1-D diesel fuel with a pour point of at least -12°C below the expected ambient temperature to prevent fuel flow problems in cold weather.
- Keep dirt from entering the fuel tank.
- Sulfur content of the fuel should be no more than 0.5%.
- Sediment and water content should not exceed 0.05%.
- Minimum cetane number is 40. Low temperature or high altitude operation may require use of fuel with a higher cetane number.
- Use properly mixed winter fuel when temperatures are extremely cold. In most areas, diesel fuel is properly blended for summer and winter grades as ambient temperatures change. In winter, use winter grade diesel fuel only. Otherwise, the fuel may jell and block the fuel system.

Fuel Usage Safety

- UNDER NO CIRCUMSTANCES should gasoline, alcohol, or gasohol be added to diesel fuel. These combinations can create an increased fire or explosive hazard.
- Never remove the fuel cap or refuel the tractor while the engine is running.
- Never smoke while refueling or anywhere near fuel.
- When filling the tank, maintain control of the nozzle.
- Do not fill the fuel tank to capacity. Allow room for expansion.
- Wipe up spills immediately.
- Always tighten the fuel cap securely.
- If the original fuel tank cap is lost, always replace it with a SHIBAURA approved cap. A "will-fit" cap may not be safe.
- Keep equipment properly maintained.
- Do not drive equipment near open fires.
- Never use gasoline for cleaning parts.

⚠ WARNING ⚠

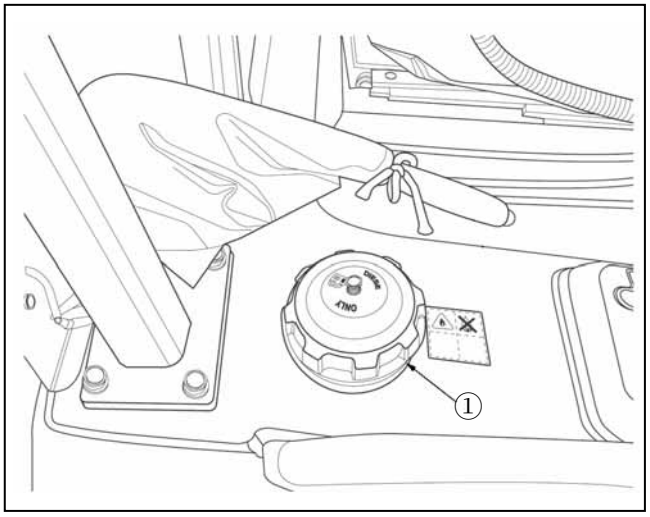
Fuel oil in the injection system is under high pressure and can penetrate the skin. Unqualified persons should not remove or attempt to adjust a pump injector, nozzle, or any part of the fuel injection system.

- **Do not use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks.**
- **If any fluid is injected into the skin, obtain medical attention immediately or gangrene may result.**

Failure to follow these instructions can result in serious injury.

Refueling the Tractor

The fuel tank filler cap ① is located on top of the RH fender, to the rear of the control pod. Before removing the cap, wipe all dust and dirt from around the cap to prevent debris from falling into the tank during filling.



Use an approved container and check the inside of the container periodically for cleanliness. The tractor fuel tank capacity is 29.5 L.

NOTE: *The fuel cap is a vented-type. Use only an approved SHIBAURA replacement cap to prevent fuel system-related problems.*

If there is no filter on the storage tank or fuel container, filter the fuel through a 100-mesh or finer screen when filling the tractor fuel tank. Keep the tractor tank as full as possible (without overfilling) to minimize condensation.

NOTE: *It is a good practice to fill the fuel tank at the end of each day, as this will reduce overnight condensation.*

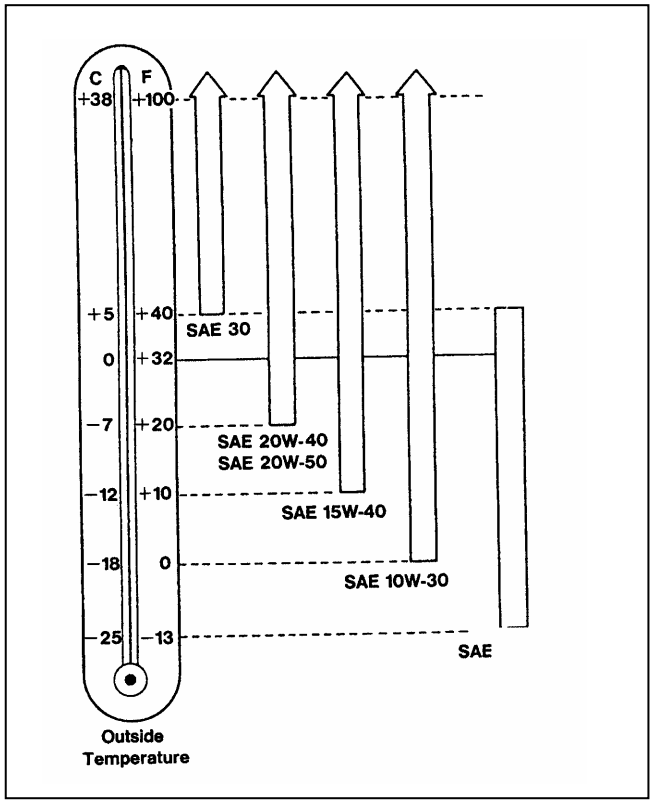
LUBRICANTS

Type of lubricant to use,
Transmission, Rear Axle, Final
Reduction, and Hydraulic System ····· ISO VG 46
Hydraulic Transmission Oil ····· ISO VG 46
Front Axle, Final Reduction Oil ····· SAE 80
Engine Crankcase····· Service Grade CD
SAE 10W30, for year around use
or
SAE 20W for use -5°C–25°C
SAE 30 for use 10°C–35°C

All Lubrication Fittings·····NLG 1 GRADE 2 EP GREASE WITH LTIUM SOAP

NOTE: *Use the following chart to determine which SAE Grade engine oil to use:*
In areas where prolonged periods of extreme temperatures are encountered, local lubricant practices are acceptable, such as the use of SAE 5W (CC) in extremely cold temperatures or the use of SAE 40 (CD) or SAE 50 (CD) in extremely high temperatures.

IMPORTANT: *Engine crankcase oil drain intervals should be adjusted downward when diesel fuel sulfur content is over 0.5%.*
Consult your dealer for details of Engine Crank case Oil usage.



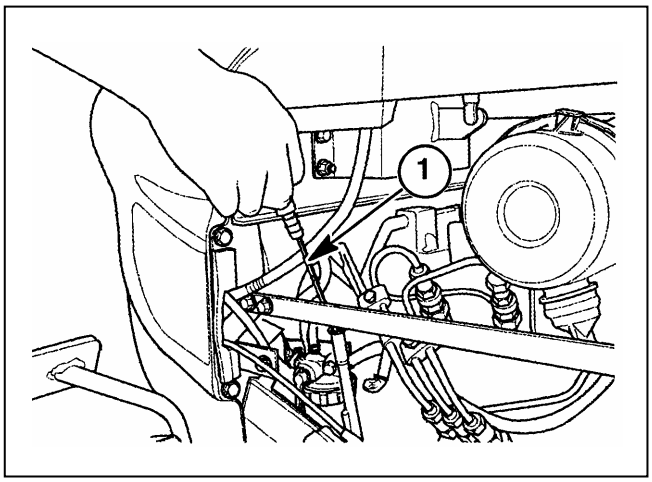
FUEL AND LUBRICANT SERVICE PROCEDURES

ENGINE

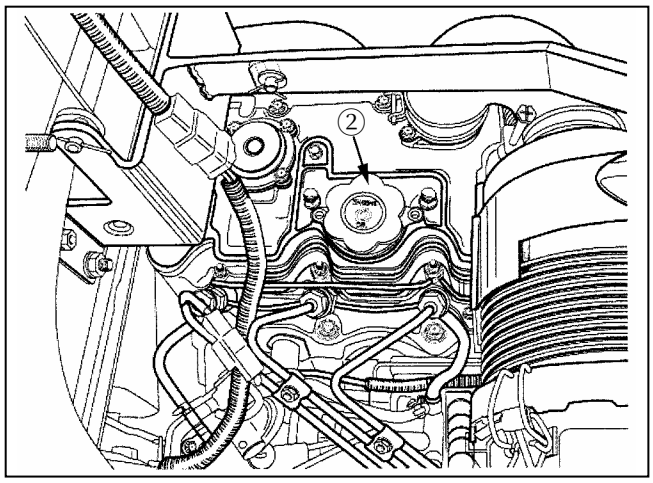
Check the engine oil level

NOTE: *Check the engine oil level daily, or after every 10 hours of operation.*

1. After the engine has been stopped for a period of time, and with the tractor standing level, check the oil level using the dipstick.



2. If the oil level is low, remove the filler cap ② and add oil through the filler hole. Add enough oil so that the level registers between the two marks on the dipstick. Do not overfill.

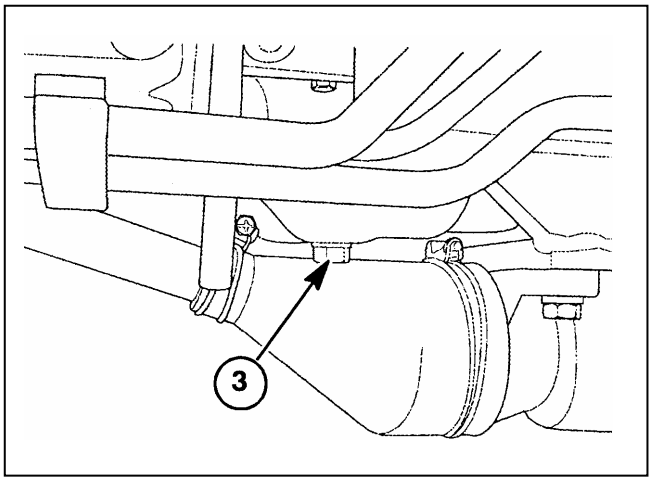


Changing the Engine Oil

NOTE: *Change the engine oil and filter after the first 50 hours of operation, then every 100 hours thereafter. If the tractor is operated for extended periods of time at maximum rated power and speed, or under other types of continuous, severe operating conditions, the engine oil and filter should be changed at 70-hour Intervals following the initial oil change.*

To change the engine oil:

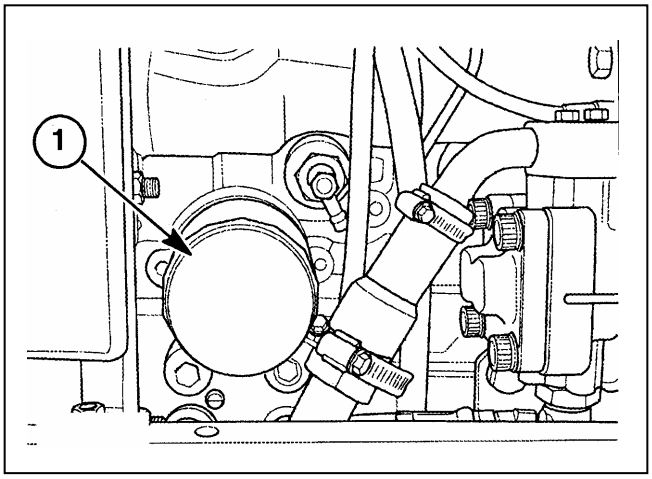
1. Place a suitable container beneath the drain opening to catch the used oil. With the tractor engine off but at normal operating temperature, remove the drain plug ③. Reinstall the plug after all of the oil has been drained.



⚠ CAUTION ⚠

Engine oil could be hot, use caution during draining.

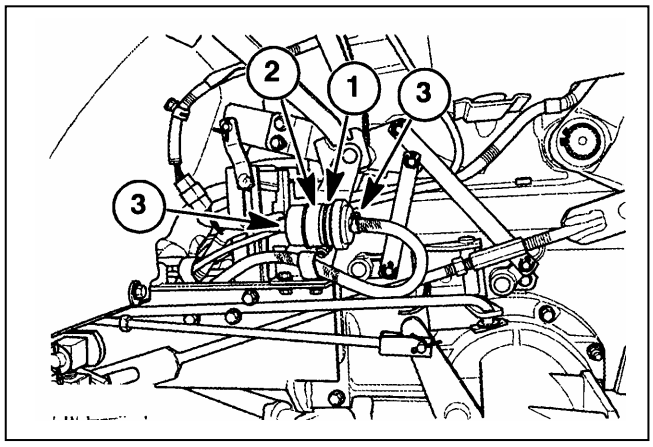
2. Place a suitable container below the oil filter ① to catch the used oil and unscrew the oil filter. Discard the used oil and filter.
3. Coat the gasket on the new filter with a thin film of new oil. Screw the filter into place until the gasket contacts its mating surface, then turn the filter approximately three-quarters of a turn BY HAND. Do NOT overtighten.
4. Add the proper type and amount of new oil, then start the engine and check the filter for leaks. The crankcase capacity (with filter) on these tractor models is 4.0L.



PRIMARY FUEL FILTER

NOTE: *Primary fuel filter should be replaced every 300 hours of operation.*

The primary fuel filter ① is installed in the fuel line between the fuel tank and the electric fuel pump. Location left rear of tractor, (left rear tire removed for clarity).



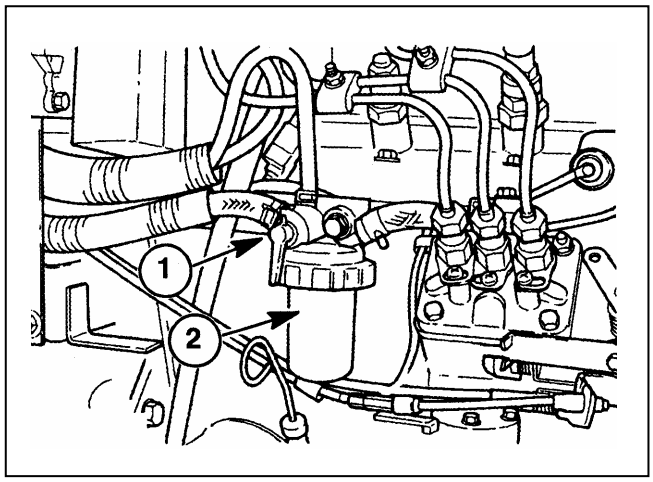
To replace filter:

1. Remove left rear tire assembly and support axle with jack stand.
2. Drain the fuel tank or pinch the fuel hose to prevent fuel leakage.
3. Remove filter mounting clamp ② from filter.
4. Loosen clamps ③ from fuel line and remove fuel filter from fuel hose.
5. Install new fuel filter, pay attention to directional arrow on filter, arrow points in direction of fuel flow, from tank to engine.
6. Install line clamps ③ and mounting clamp ② to filter.
7. Check for any leakage, place key switch in the "ON" position for a several seconds to bleed any air out of fuel system.

SECONDARY FUEL FILTER

Draining the Fuel Filter

NOTE: *The fuel filter should be drained after every 100 hours of operation.*

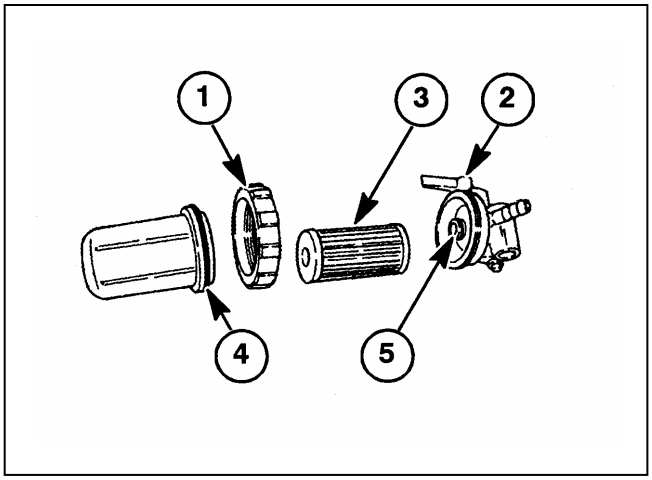


1. Make sure there is adequate fuel in the fuel tank and close the fuel shutoff valve ① (the handle should be pointing to the "C" position). Remove the fuel sediment bowl ②.
2. Open the fuel shutoff valve until all water has been removed and only fuel flows from the filter base.
3. Install the fuel sediment bowl and bleed the system as outlined in "Bleeding the Fuel System."

NOTE: *Valve is shown in open position.*

Changing the Fuel Filter

NOTE: *Change the diesel fuel filter after the first 50 hours of operation, then following every 200 operating hours thereafter.*



1. Close the shutoff valve (the handle should be pointing to the "C" position).
2. Remove the sediment bowl by rotating the retaining nut ①.
3. Open the fuel shutoff valve ② to drain any remaining water from the tank.
4. Discard the old element ③ and install a new element.
5. Inspect the O rings ④ and ⑤ and replace if necessary.
6. Install and securely tighten the sediment bowl.
7. Open the fuel shutoff valve (the handle should be pointing to the "O" position) ② so fuel will flow to the filter.
8. Bleed the fuel filter and injection pump as described next in "Bleeding the Fuel System."

Bleeding the Fuel System

Bleed the fuel system if:

- it has been drained.
- a new filter element has been installed.
- the tractor has run out of fuel.
- the lines leading to or from the filter have been disconnected.
- the injection pump has been removed and reinstalled.

⚠ WARNING ⚠

Fuel oil in the injection system is under high pressure and can penetrate the skin. Unqualified persons should not remove or attempt to adjust a pump injector, nozzle, or any part of the fuel injection system.

- **Do not use your hand to check for leaks Use a piece of cardboard or paper to search for leaks.**
- **If any fluid is injected into the skin, obtain medical attention immediately or gangrene may result.**

Failure to follow these instructions can result in serious injury.

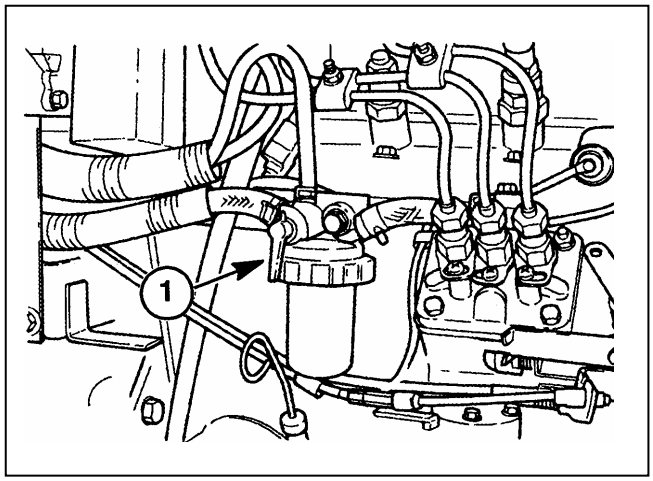
To bleed the fuel system:

1. Make sure there is adequate fuel in the fuel tank.

2. Open the fuel shutoff valve ①.

3. Turn the key switch to the "ON" position. When the key switch is in the "ON" position, the electric fuel pump will operate and allow trapped air to escape from the fuel filter.

4. Push the hand throttle to the high speed position. Turn the engine over for a few seconds to bleed the high pressure fuel tubes.



Bleeding the Injector Lines

Bleed the injector lines if:

- the tractor has run out of fuel.
- new injectors have been installed.
- the injection pump has been removed for service repairs.

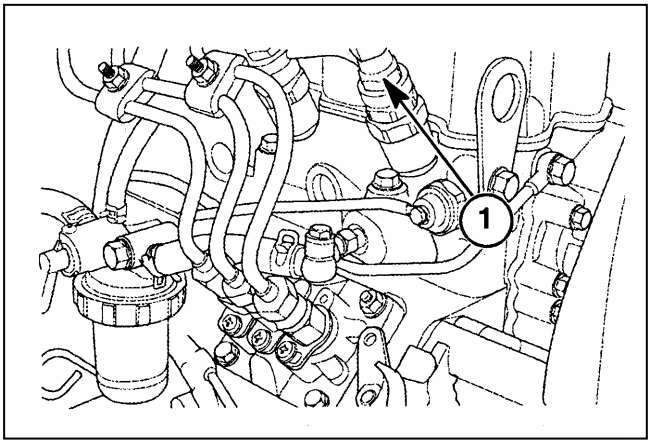
To bleed the injector lines:

1. Loosen the injector line fittings ① at the injectors.

2. Move the hand throttle control lever to its wide open position.

3. Crank the engine until air-free fuel flows from each connection, then tighten the fittings to 24-29 N·m.

IMPORTANT: *If air is not purged from the system, repeat the above procedures.*

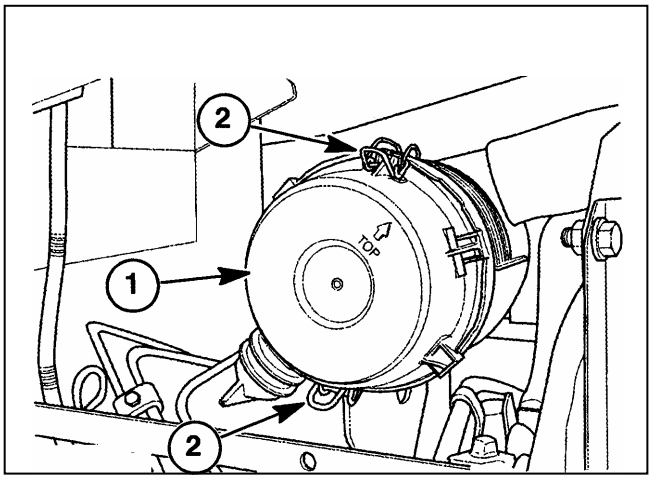


Do not crank the engine continuously for more than 30 seconds as this may cause starter motor failure.

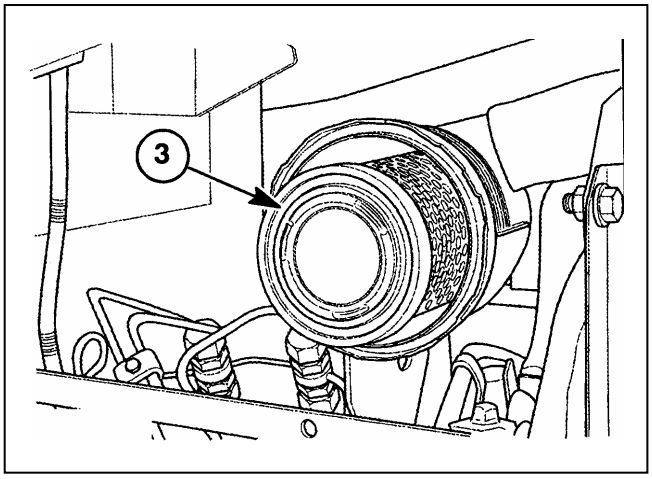
AIR CLEANER

The air cleaner ① is accessed by opening the tractor hood.

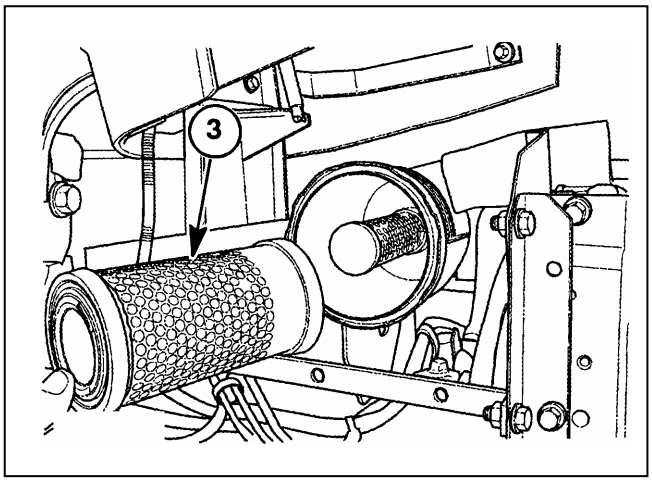
The air cleaner assembly contains two elements: an outer (primary) element, and an inner (safety) element.



To remove the primary element, loosen the spring clamps ② and remove the end cap from the air cleaner body to expose the primary element ③.



Air Cleaner Primary Element



NOTE: *Clean the primary element after every 100 hours of service. Extremely dusty conditions may require more frequent service intervals.*

1. Pull the primary element ③ from the canister. Clean any loose dirt from the canister, and inspect the end of the canister for dirt which may prevent the new element from seating properly.
2. Clean the primary element using low pressure air (30 PSI or less). Blow dust from the inside toward the outside of the element (i.e., opposite to normal air flow through the element).

IMPORTANT: *Be careful not to rupture the filter element. Maintain a safe distance between the air nozzle and the filter element when directing air up and down the clean air side of the element pleats.*

3. After cleaning the element, check the inner diameter seals for damage. If damage is present, replace the primary element. Change the element after six cleanings or once a year.
4. Reinstall the primary element by inserting it into the canister and pushing on the end of the element until it is seated against the canister.

NOTE: *Place a light inside the element to check for paper leaks or for bonding of the paper to the end plate. If any leaks are found, replace the element.*

NOTE: *If element is not inserted far enough into canister, the end cap cannot be installed.*

5. Place the end cap onto the canister body and attach spring clamps. Make sure the end cap is locked in place and not loose.

IMPORTANT: *Never tap the element with hard objects or against a hard surface. This may dent or break the element end cap seals.*

IMPORTANT: *Failure to obtain a good seal between elements and the canister may cause major engine damage, by allowing dirt to enter the engine.*

Air Cleaner Inner Safety Element

NOTE: *Clean the primary element after every 100 hours of service. Extremely dusty conditions may require more frequent service intervals.*

1. Pull the primary element ① from the canister. Clean any loose dirt from the canister, and inspect the end of the canister for dirt which may prevent the new element from seating properly.

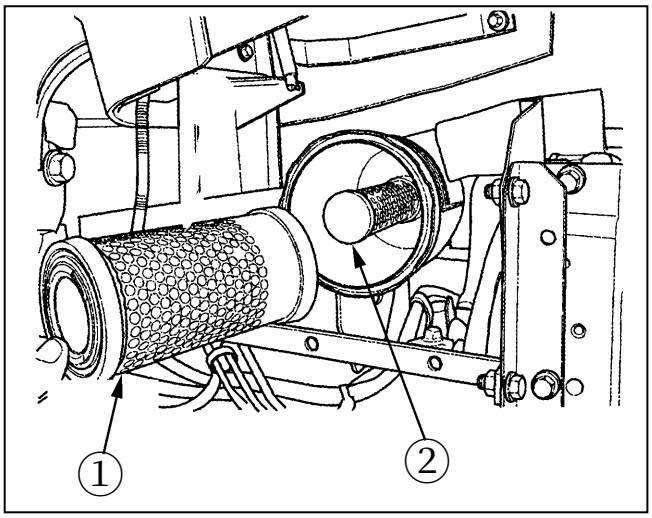
NOTE: *Conduct a visual inspection of the inner safety element ② by placing a light inside the element. Little or no light will shine through the element if it is partially clogged.*

To remove the inner safety element, pull it out of the canister body.

To install the new element, push it into the canister until seated.

IMPORTANT: *Clean any dirt from the canister before installing the inner safety element. Check element inner diameter seals for damage and replace the safety element if seal damage is present.*

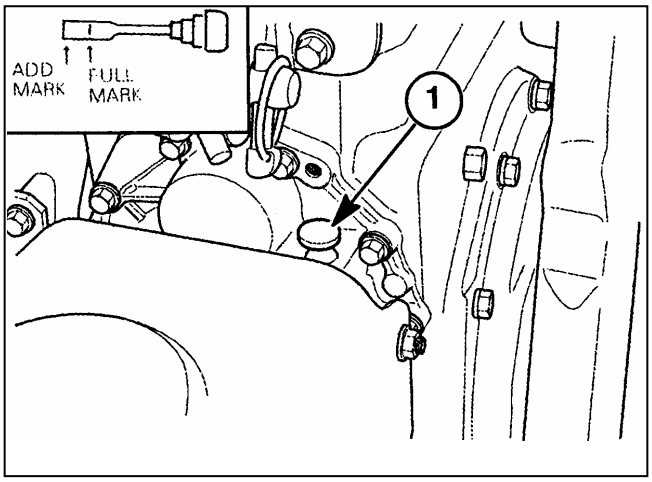
IMPORTANT: *Failure to obtain a good seal between the filter and canister may cause major engine damage, by allowing dirt to enter the engine.*



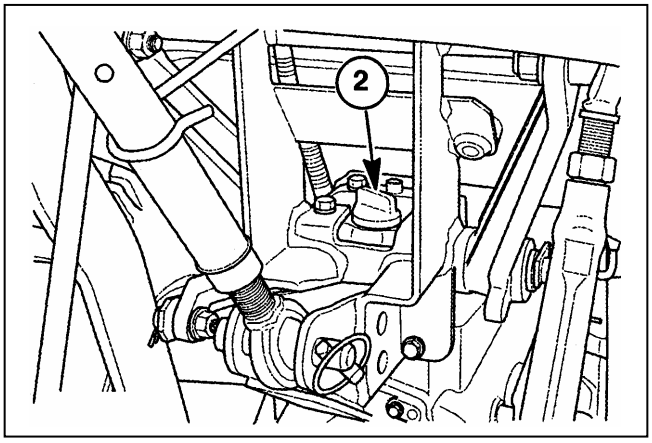
TRANSMISSION, REAR AXLE, AND HYDRAULIC SYSTEM

Checking the Transmission, Rear Axle, and Hydraulic System Oil Level

NOTE: *Check the transmission, rear axle, and hydraulic system oil level after every 50 hours of operation.*

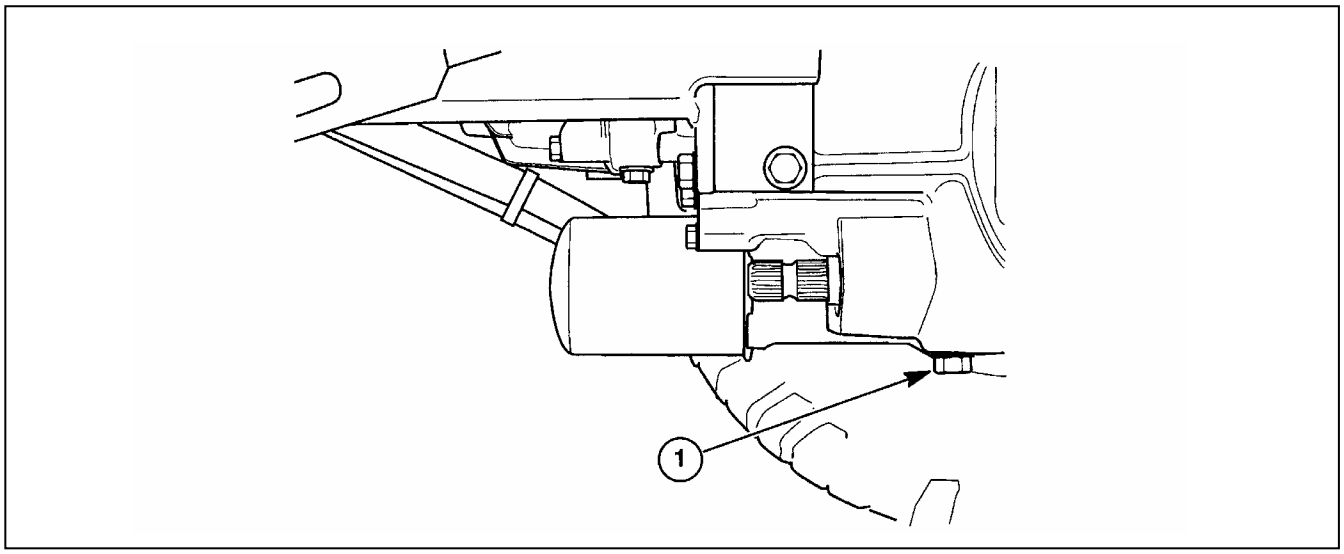


1. With the engine off and the tractor standing level, check the oil level using the dipstick ①. The dipstick is located on the rear of the transmission housing, on the RH side, above the rear PTO guard. The oil is at the correct level when it reads between the two marks on the dipstick, after fully inserting dipstick.



2. If the level is low, remove the filler plug ② and ISO VG 46 hydraulic oil through the filler hole. The filler plug is located on the upper rear of the transmission housing, above the hydraulic lift rocker. Do not fill above the dipstick 'full' mark.

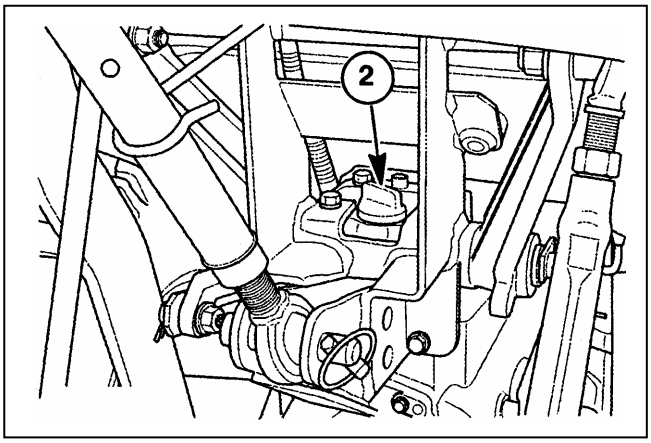
3. Reinstall the filler plug and dipstick.



Changing the Transmission, Rear Axle, and Hydraulic System Oil

NOTE: *Change the transmission, rear axle, and hydraulic system oil after every 300 hours of operation.*

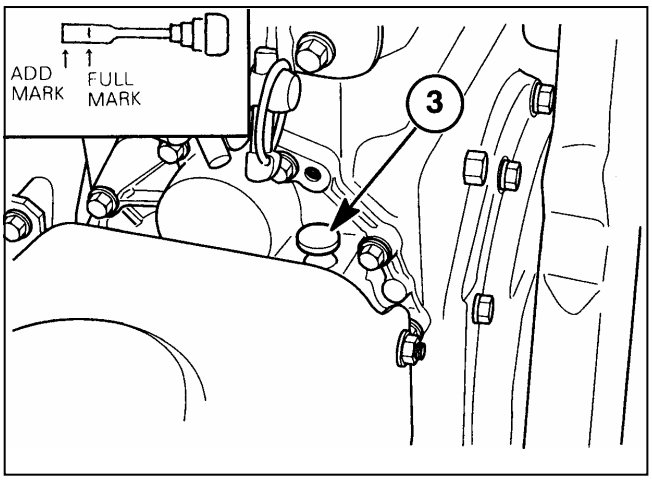
NOTE: *During cold weather operation, tractor hydraulic oil can be changed to ISO VG 46 oil is a multiviscosity oil which has improved flow characteristics in low temperatures and can be used year round.*



1. Place a suitable container beneath the transmission and rear axle drain plug to catch the used oil. (Note that the combined reservoir holds 13L of oil.) With the oil at normal operating temperature, drain the system by removing the transmission and rear axle drain plug ① and the filler plug ②. Reinstall the drain plug after all of the oil has drained out. Discard the used oil properly.

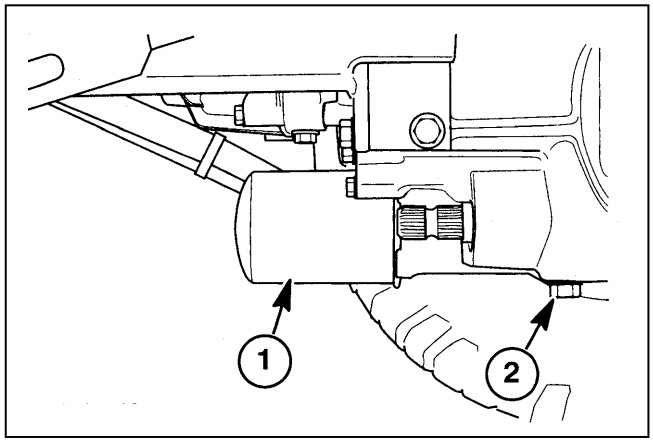
2. Add ISO VG 46 hydraulic oil at the filler hole, ②. The transmission is filled to the correct level when the oil registers between the two marks on the dipstick ③. Do NOT fill above the dipstick full mark. Capacity for the H.S.T. reservoir is 13L.

3. Reinstall the dipstick and filler plug.



IMPORTANT: *There is a common sump for the transmission, rear axle, and hydraulic system. Therefore, extra care should be taken to keep the oil clean.*

HYDRAULIC SYSTEM OIL FILTER



NOTE: *Replace the hydraulic system oil filter ① after the first 50 hours of operation, and then following every 300 hours of operation thereafter.*

The hydraulic system uses a spin-on type oil filter, located on the RH side of the front of the transmission, below and in front of the rear axle. To replace the filter:

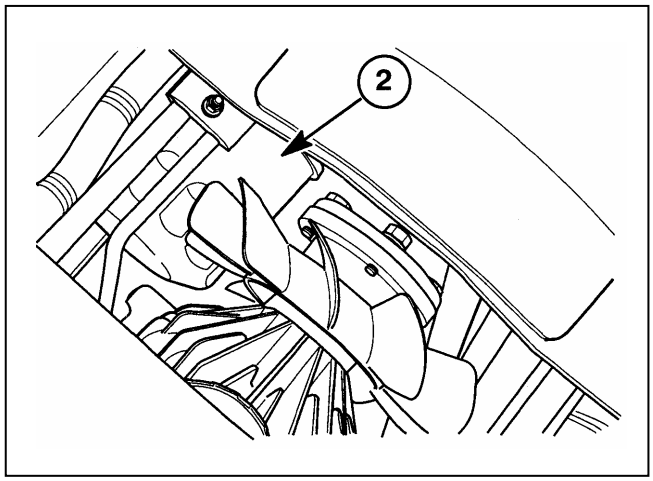
1. Place a suitable container beneath the filter, to collect any oil that drains out during the filter change.

NOTE: *Removing the hydraulic oil filter will drain most of hydraulic reservoir.*

Remove transmission drain plug ② before removing hydraulic filter.

2. Unscrew the used oil filter ① and discard.
3. Coat the gasket on the new filter with a thin film of clean oil. Screw the filter into place until the gasket contacts the sealing surface, then tighten the filter BY HAND approximately three-quarters of a turn. Do NOT overtighten.
4. Start the engine and check the filter for leaks.
5. Stop the engine and check the hydraulic system oil level. Add oil if necessary.

HYDROSTATIC TRANSMISSION (H.S.T.) SYSTEM OIL FILTER



NOTE: *Change the H. S. T. system oil filter ② after the first 50 hours of operation, and then following every 300 hours of operation thereafter.*

The H.S.T. system oil filter is located just below the main platform deck in front of the driver's seat. The filter is mounted inside the LH side of the chassis frame, facing rearward, and can be accessed from below the tractor. It is helpful to remove the plastic access cover in the main platform deck immediately in front of the driver's seat, to provide a clear view of the filter during changeover.

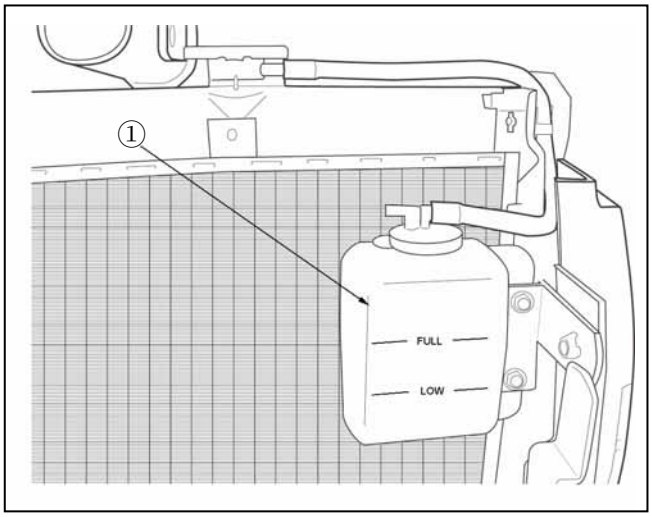
To change the H.S.T. system oil filter ② follow the procedures found above for changing the hydraulic system oil filter.

GENERAL MAINTENANCE

COOLING SYSTEM

The tractor engine must operate at the correct temperature to obtain maximum efficiency and service life. This is dependent on the cooling system.

Always fill the system with a 50/50 solution of permanent antifreeze and clear water.

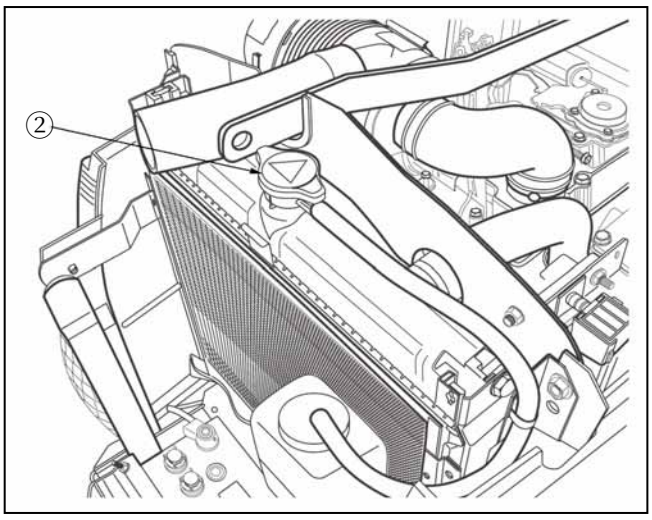


Checking the Coolant Level

NOTE: *Check the coolant level daily or after every 10 hours of operation. The engine should be cold when coolant level is checked.*

Open the hood, and check the coolant recovery reservoir, mounted to the LH side of the radiator frame. The fluid level should be between the 'low' and 'full' marks on the reservoir ①.

If the coolant recovery reservoir is empty, carefully remove the radiator cap ② and add the antifreeze/ water solution directly into the radiator until the radiator is full. Then cap the radiator and add the solution to the recovery reservoir to bring the level up to the 'full' mark.



⚠ WARNING ⚠

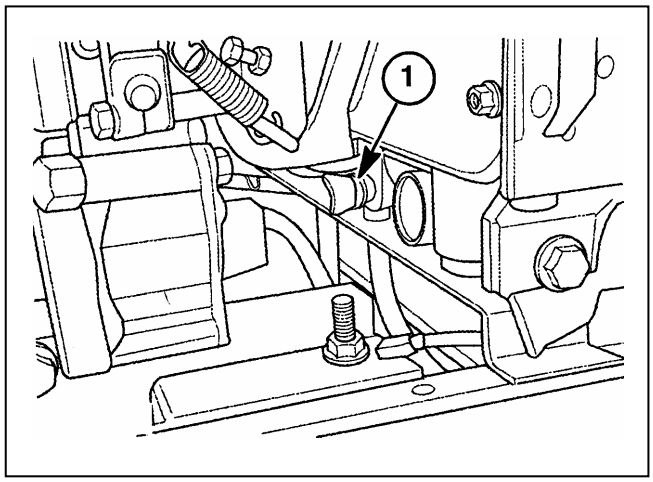
The cooling system operates under pressure controlled by the radiator cap. It is dangerous to remove the cap while the system is hot. Always cover the cap with a thick cloth and turn it slowly counterclockwise to the first stop. Allow all pressure to escape before removing the cap completely.

If the coolant level is below the low mark on the reservoir, add a 50/50 solution of water and antifreeze to the coolant recovery reservoir bringing the level to the full mark.

Be sure that the radiator fins are clear of chaff and dirt to allow free air movement.

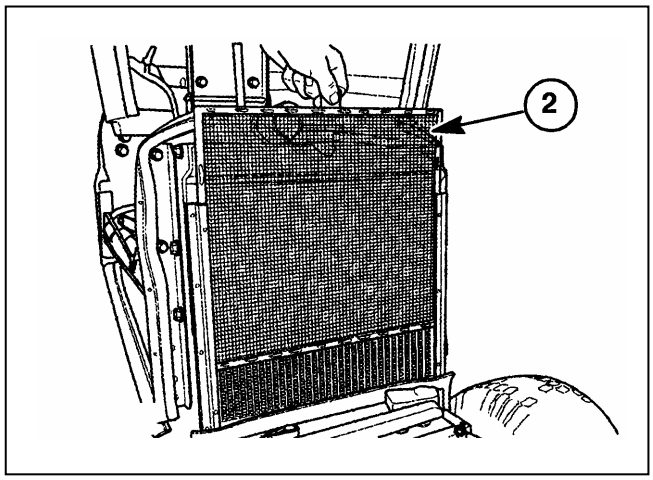
Draining and Flushing the Cooling System

NOTE: *Drain and flush the radiator and engine block every 12 months. Refill with a 50/50 solution of permanent antifreeze and clear water.*



To drain the cooling system:

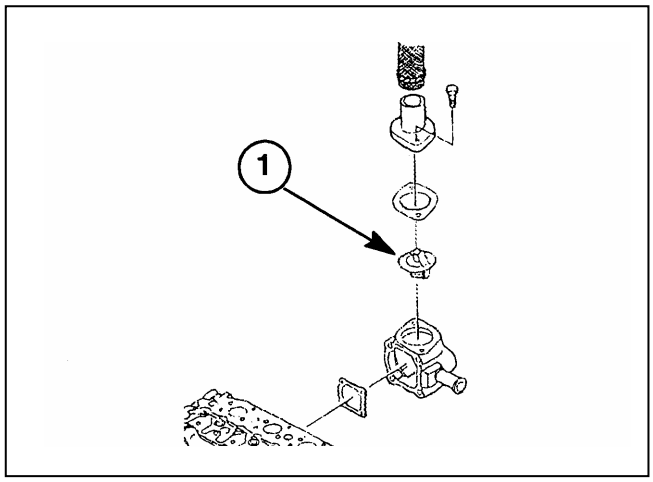
1. Place a suitable receptacle to catch the used coolant. (The coolant system capacity is 3.5L). Re move the radiator cap and open the drain valve ① on the bottom center of the radiator to drain the coolant from the radiator and engine block.
2. After the coolant has drained, place a water hose in the radiator filler neck and run water through the system. After water begins flowing out of the drain valve, start the engine. Run the engine until the water flowing from the drain valve is free of discoloration and sediment, then stop the engine and remove the hose. Allow all water to drain from the system through the drain valve.
3. Close the drain valve and slowly refill the system with a 50/50 solution of permanent antifreeze and clear water. Fill the radiator until the coolant level is approximately 3.8 - 5 cm below the bottom of the filler neck. Do not fill beyond this level.
4. Clean the radiator cap and cap seal and install the cap.
5. Fill the coolant recovery reservoir until the fluid level is between the "full" and "low" marks on the reservoir.
6. Clean the radiator front screen ②.
7. Run the engine until normal operating temperature is reached, then stop the engine. Recheck the coolant level when the engine has cooled, and add more coolant as necessary.



IMPORTANT: *NEVER run the engine when the cooling system is empty. Do NOT add cold water or cold antifreeze solution if the engine is hot.*

Thermostat

The thermostat is a heat-sensitive valve located in the coolant outlet connection in the front of the cylinder head.



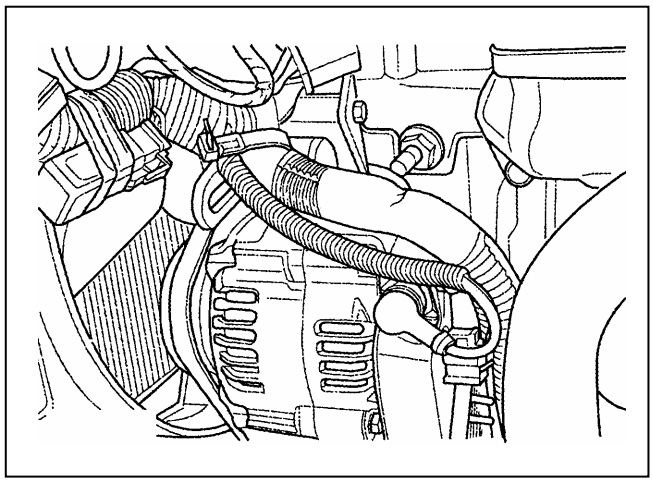
When the engine is cold, the thermostat shuts off the flow of coolant to the radiator, allowing for rapid engine warm-up. A recirculating bypass allows coolant to circulate inside the engine whenever the thermostat shuts off flow to the radiator.

IMPORTANT: *Do not attempt to improve cooling by removing the thermostat. This will cause the engine to run below normal working temperatures, resulting in excessive engine wear.*

To install a new thermostat ① position it in the recess of the water outlet connection so that the heat element (spring end) is in the cylinder head of the engine.

Fan Belt

NOTE: *Check the condition of the fan belt after every 50 hours of operation. Check fan belt tension after every 200 hours of operation.*



A belt-driven fan located at the front of the engine draws air through the fins of the radiator to lower the temperature of the radiator coolant.

When 5 kg of thumb pressure is applied to the belt midway between the belt pulleys, a correctly tightened belt will deflect 5 - 10 mm.

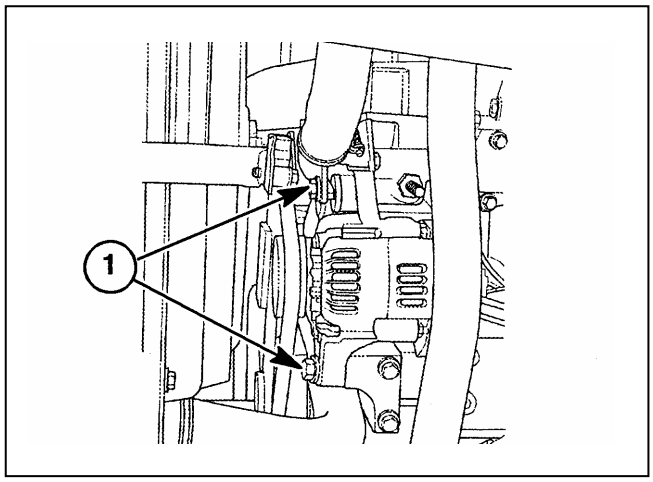
If the fan belt is slipping, fan efficiency is lowered, resulting in the engine running too hot. If the belt is too tight, the life of the alternator bearing will be shortened. If the fan belt shows signs of cracking or fraying, install a new belt.

To adjust fan belt tension:

⚠ WARNING ⚠

Never attempt to loosen or tighten mounting bolts while the engine is running.

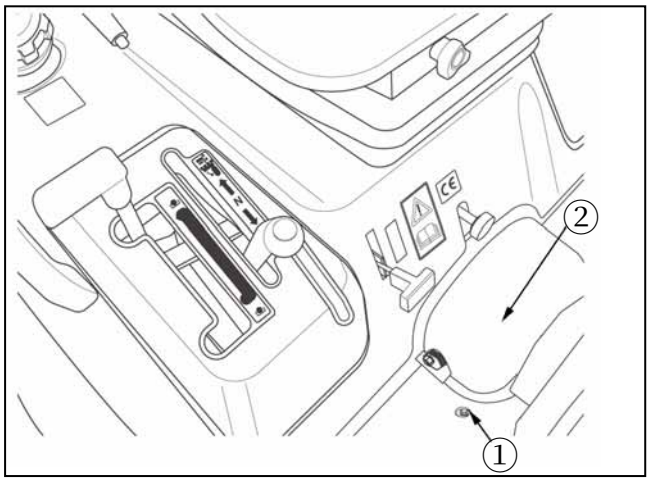
1. Loosen the alternator mounting bolts ①.
2. Pry the alternator away from the engine and tighten the mounting bolts.
3. Recheck belt deflection.



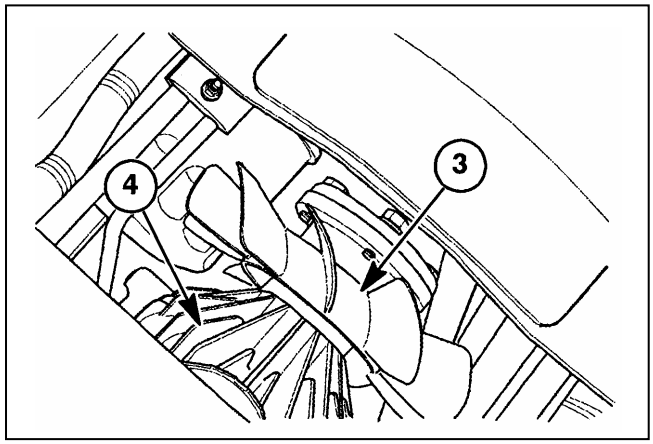
Hydrostatic Transmission (H.S.T.)

After every 100 hours of operation, ensure proper cooling of the H.S.T.:

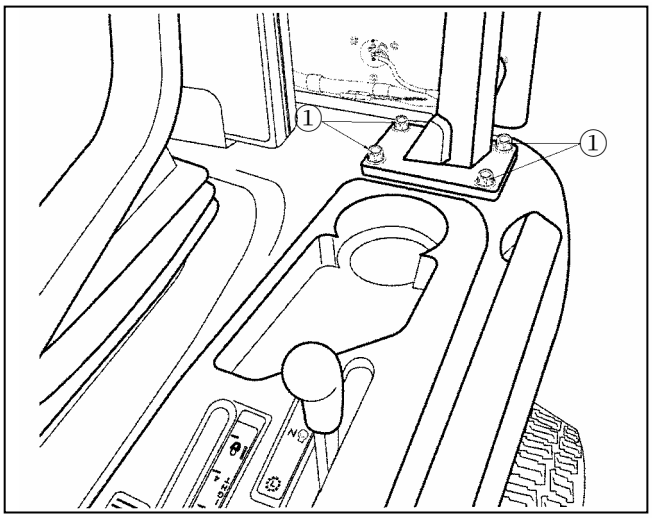
1. Remove the four retaining bolts ① and plastic access cover ② from the operator's platform, to gain access to H.S.T. cooling fan.



2. Using low-pressure air, carefully clean out any debris found in the fan blades ③ or the cooling fins on the H.S.T. housing ④. Also examine fan for cracked or missing blades.
3. Replace the access cover.



MAINTENANCE AND INSPECTION OF THE ROLLOVER PROTECTIVE STRUCTURE (POPS)



NOTE: *Inspect the ROPS after the first 20 hours of operation. Following the initial inspection, check the ROPS after every 500 hours of operation or every six months, whichever comes first.*

1. Check the torque of the ROPS mounting bolts ① on top of each fender. Tighten the bolts to the correct torque of 50 N·m if necessary.

POSSIBLE DAMAGE TO THE ROPS

If the unit has rolled over or the ROPS has been in some other type of accident (such as hitting an overhead object during transport), the ROPS must be replaced to retain the best protection.

Following an accident, check the ROPS, the operator's seat for possible damage. Before operating the machine, replace all damaged parts.

IMPORTANT: *Do not attempt to weld or straighten the ROPS.*

⚠ WARNING ⚠

Always pull from the tractor drawbar pin hole. Never attach chains, ropes, or cables to the ROPS or cab for pulling purposes or the tractor will tip backwards.

⚠ WARNING ⚠

If the ROPS or cab is removed or replaced, make sure that the proper hardware is used and the recommended torque values are applied to the attaching bolts.

BATTERY

The tractor is equipped with a BCI group 51, 12-volt battery, with a minimum cold cranking ability of 450 amps at -18ºC.

Make sure the battery connections are tight and free of corrosion. A solution of backing soda and water may be used to clean the outside surface and terminals of the battery when necessary. However, ensure that the none of the solution gets inside the battery. After cleaning, rinse the battery with clean water, then apply a small amount of petroleum jelly to the terminals to prevent corrosion.

In freezing temperatures, a good battery charge must be maintained. If the battery becomes discharged or run down, the electrolyte becomes weak and may freeze, causing damage to the case. If you must add water, use distilled water. Add the water just before using the tractor so that the water will mix with the electrolyte during the charging process, thus preventing the water from freezing.

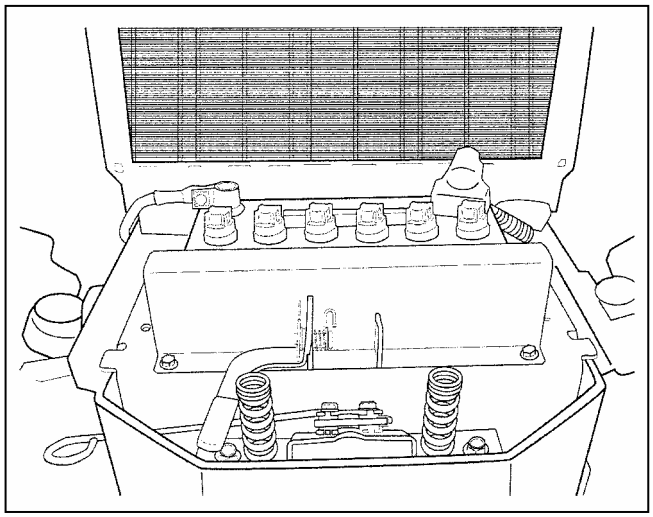
To determine the battery charge, check the specific gravity of the electrolyte.

Checking the Electrolyte Level

NOTE: *Check the battery electrolyte level after every 50 hours of operation.*

⚠ WARNING ⚠

Always check the electrolyte level with the tractor engine off, as an explosive gas is produced inside the battery when the alternator is charging. Do not use an exposed flame and do not smoke when checking the battery electrolyte level.



To check the battery electrolyte level:

1. Clean the top of the battery, then remove the vent plugs.
2. Add distilled water if the electrolyte level is low. The level is correct when the liquid is 6.35 mm above the plates.

NOTE: *Keep distilled water in a nonmetallic container that is clean and well-covered.*

3. Install the vent plug after making sure the vent holes are not blocked. At below freezing temperatures, run the engine for a period of time after adding water, allowing the battery to charge, which prevents the water from freezing.

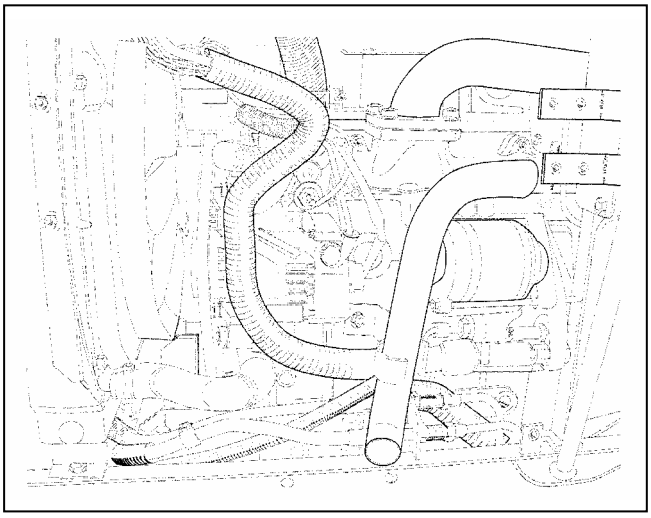
ALTERNATOR

The tractor's 40-amp alternator is belt-driven from the engine crankshaft pulley. It is important that belt slippage does not occur, or the charging system will be adversely affected. To adjust the belt, see the instructions previously given under "Fan Belt" section.

When working on or checking the alternator, adhere to following precautions or alternator damage may occur:

- Do not UNDER ANY CIRCUMSTANCES short the field terminal of the alternator to ground.
- Do not disconnect the alternator output lead or battery cables while the alternator is operating.
- Do not remove the alternator from the tractor without first disconnecting the negative (-) battery cable. When removing the battery, disconnect the negative (-) cable first.
- To install a battery, MAKE SURE that the positive (+) cable is connected first and that the negative terminal is connected to ground. Reverse polarity will destroy the rectifier diodes in the alternator.

If the battery charge warning light illuminates, indicating that the alternator is not charging the battery, check the fan belt and the wiring connections. If these items are in satisfactory condition and the warning light continues to indicate no charge, consult your SHIBAURA Dealer.

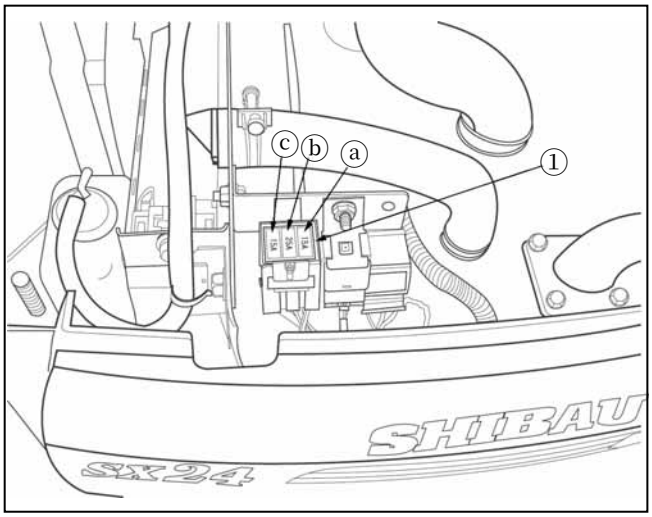


FUSE BLOCK

The fuse block ① is located on the top LH corner of the radiator bulkhead. Always replace blown fuses with the size specified for that circuit.

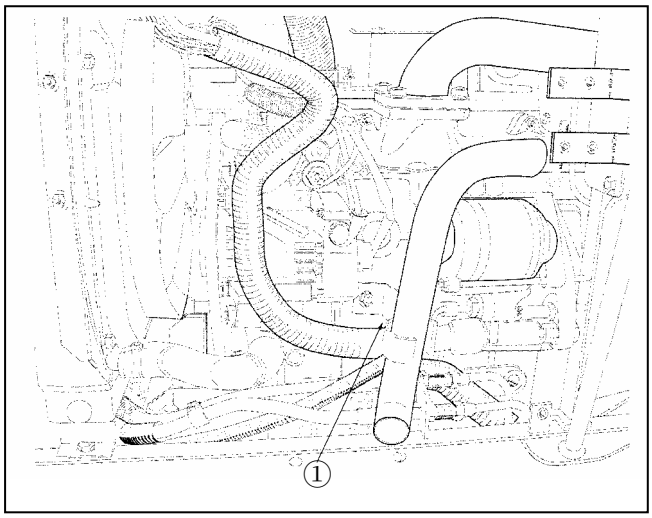
From top to bottom, as viewed from the RH side of the tractor, the fuse block contains the following fuses:

Fuse	Fuse Size	Circuit Protected
a	15A	Instrument panel, Alternator, Fuel pump.
b	25A	Head lights, position & Tail lights, BRAKE Lights (side)
c	15A	Hazard Flasher & Turn signal light, Horn



MAIN FUSE

The main 40-amp fuse ① is located on the LH side of the engine, between the starter and the alternator. This fuse protects the tractor's entire electrical system.



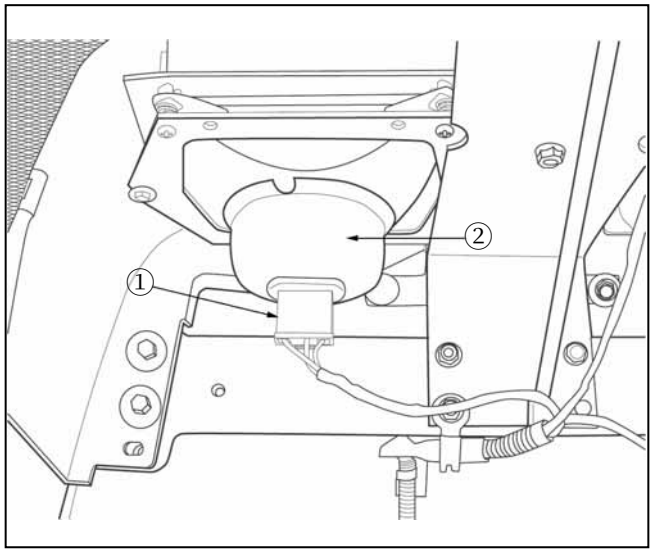
To replace the main fuse:

1. Unplug the connector, exposing the fuse.
2. Remove the old fuse from the fuse holder and replace.

IMPORTANT: *Always replace this fuse with a similar 40 amp fuse; DO NOT increase the amperage rating.*

HEADLAMP

If a headlamp fails to operate, the bulb must be replaced. To change the bulb:



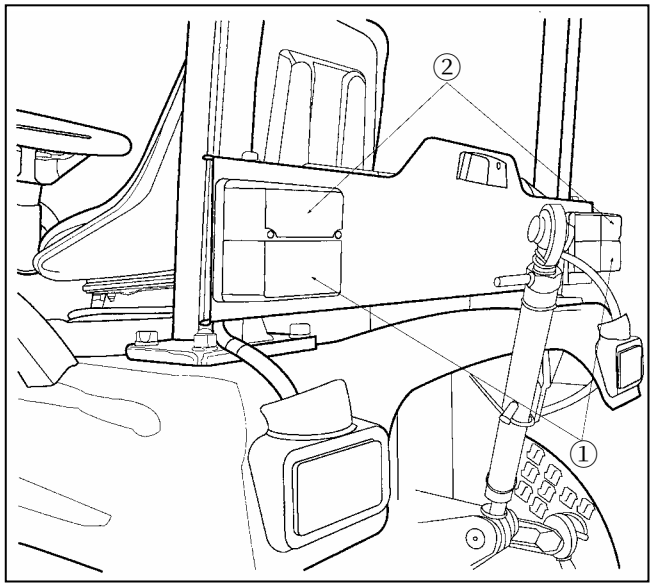
1. Open the tractor hood.
2. Pull up the connector ① and rubber ② the housing.
3. Take off the spring.
4. Remove the bulb.
5. Install a new bulb and install the spring, rubber and connector.

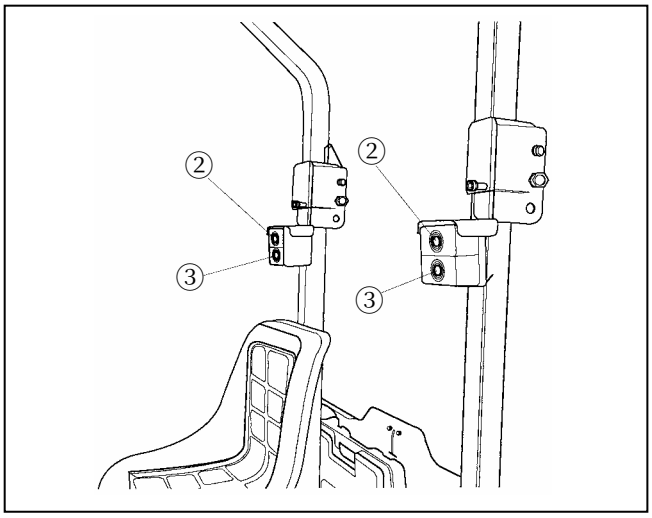
IMPORTANT: *Be careful not to touch the bulb with bare fingers. Oil from the fingers can shorten the life of the bulb. Use a protective cloth or glove when installing the new bulb.*

TAILLIGHT/FLASHER WARNING LIGHT/SIDE LIGHT

The tractor is equipped with two tail lights ① mounted on the rear board, and four flasher warning lights ② mounted on the rear board/ ROPS, and two side lights ③ mounted on the ROPS.

1. Remove the two screws securing the lens to the housing.
2. Remove the lens, then remove the bulb.
3. Install a new bulb and reinstall the lens and/or rim assembly.

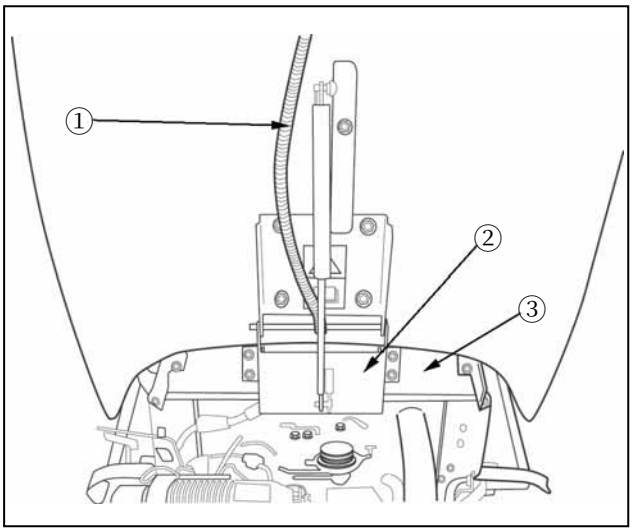




INSTRUMENT LIGHTS

To change a burned out instrument bulb:

1. Release the hood latch and raise the hood.
2. Disconnect the headlight electrical harness ①.
3. Remove the two bolts and two locknuts securing the hood hinge bracket ② to the firewall crossmember ③ and carefully set the hood aside.

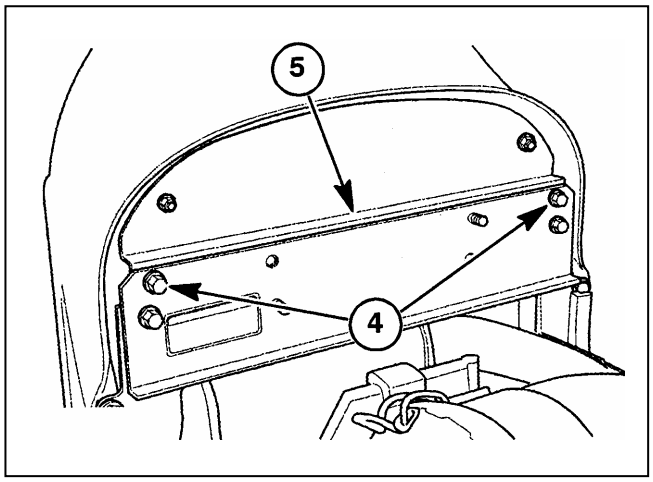


4. Remove the two bolts ④ securing the dashboard guard plate ⑤ to the firewall crossmember.

5. Lift the dashboard guard plate out of the way to access the rear of the instrument panel.

6. Rotate the defective bulb assembly counter-clockwise a quarter turn and remove it from the instrument panel.

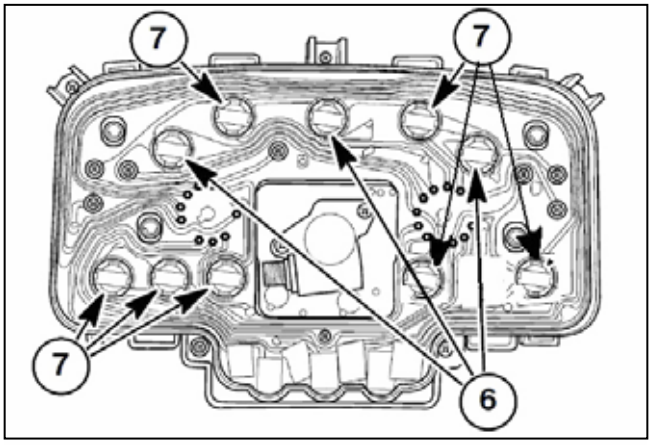
7. Replace the defective bulb assembly with a new one of the correct rating. Insert the new bulb assembly into the rear of the panel and turn it clockwise a quarter turn to secure it in place.



NOTE: *Replace the defective bulb with a new bulb of the correct rating for that function: either a (1.7W) bulb ⑥ for gauge lights, or a (3.4W) bulb ⑦ for indicator lights.*

8. Reinstall the dashboard guard plate.

9. Reattach the hood and reconnect the headlight electrical harness.



TIRES

NOTE: *Check tire pressure after every 50 hours of operation or weekly.*

Tire inflation pressure affects the amount of weight a tire can carry. Check the air pressure in your tractor tires, then locate the tires in the "Tire Inflation Pressures" chart found in this manual, If necessary, adjust the tire pressure, being careful not to overinflate or underinflate. Observe the following guidelines:

- Do not inflate a tire above the maximum pressure shown on the tire. If the tire is not marked, do not exceed the maximum pressure shown in the Tire Inflation chart found in this manual.

- Do not reinflate a tire that has been run flat or seriously underinflated until the tire has been inspected for damage by a qualified person.

- When checking tire pressure, inspect the tire for damaged sidewalls and tread cuts. Neglected damage leads to early tire failure.

⚠ WARNING ⚠

Inflating or servicing tires can be dangerous. Trained personnel should service and/or mount tires whenever possible.

If you must inflate or service tires, follow these safety precautions to avoid injury or fatality:

- Make sure the rim is clean and free of rust.

- Lubricate both tire beads and rim flanges with soap solution. Do not use oil or grease.

- Use a clip-on tire chuck with a remote hose and gauge. This allows the operator to stand clear of the tire while inflating.

- NEVER INFLATE TO OVER 2.4 BAR TO SEAT BEADS. If beads have not been seated by the time pressure reaches 2.4 bar deflate the assembly, reposition the tire on the rim, relubricate both tire bead and rim flanges, and reinflate. Inflation beyond 2.4 bar with unseated beads may break the bead or rim with explosive force sufficient to cause serious injury.

- After seating the beads, adjust inflation pressure to recommended operating pressure.

- Do not inflate a tire unless the rim is mounted on the tractor or is secured so that it will not move if the tire or rim should suddenly fail.

- Do not weld, braze, repair, or use a damaged rim.

- Never attempt tire repairs on a public road or highway.

- Use jack stands or other suitable blocking to support the tractor while repairing tires.

- Ensure the jack has adequate capacity to lift your tractor.

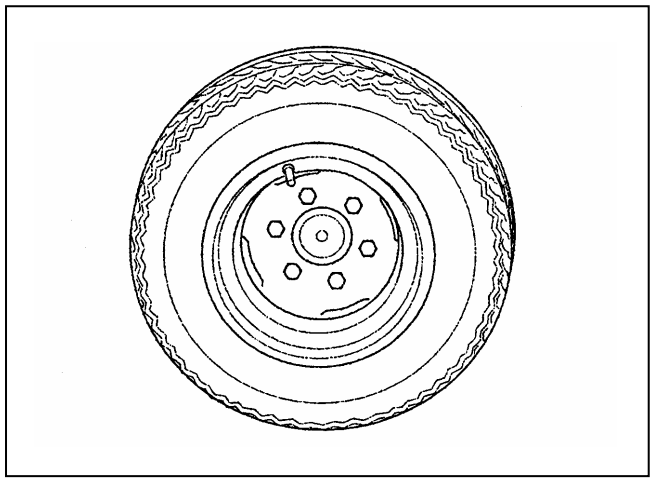
- Place jack on a firm, level surface.

- Do not place any part of your body beneath the tractor or start the engine while the tractor is on the jack.

- Before adding ballast to the tires, refer to the information in this manual on "Tractor Weighting."

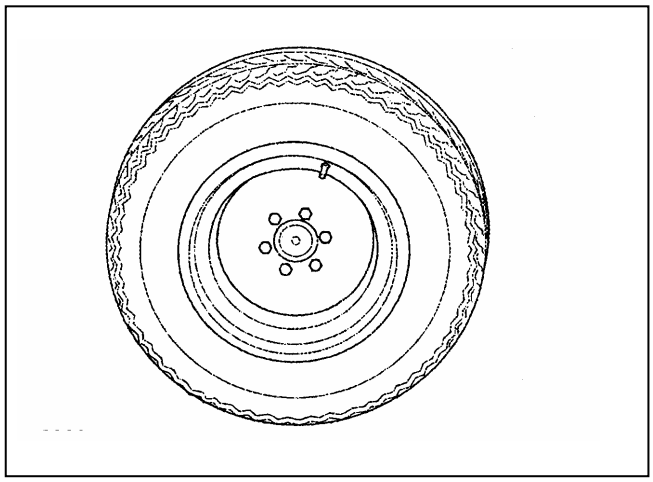
WHEEL BOLT TORQUE

Tighten the wheel bolts to the specified torque any time the wheel assembly is removed from the tractor or the wheel bolts are loosened.



Front Wheel Torque
88N·m

Rear Wheel Torque
122 N·m



Check wheel bolt torque daily until torque stabilizes.

FRONT WHEEL TOE-IN

Front wheel toe-in adjustments were made on your tractor at the factory. Normally, the wheels maintain their toe-in; however, an occasional check should be made.

Checking Toe-In

To check toe-in:

1. With the front wheels in the straight ahead position, mark the front of the wheels (not the tires) at wheel hub height.

2. Measure and record the distance between the front of the wheels at the marks, then push the tractor forward or backward until the marks are at wheel hub height on the rear of the wheel.

3. Measure and record the distance between the marks at the rear of the wheels.

4. The difference between the dimensions recorded in step 2 and step 3 should give 0 mm – 5 mm toe-in. This means that the distance between the marks on the wheels should be 0 mm – 5 mm greater when the marks are at the rear than at the front.

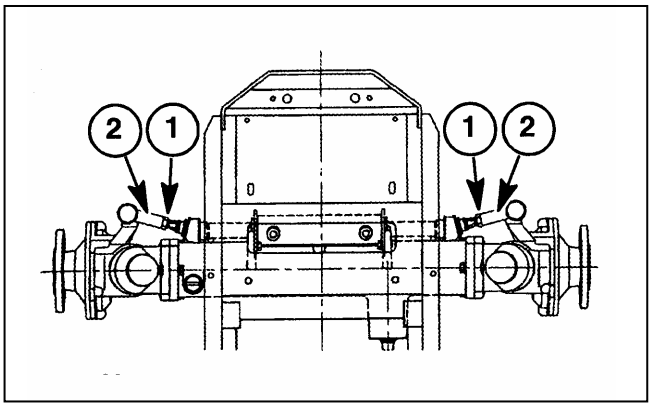
Adjusting Toe-In

If toe-in is not correct, adjust as follows:

1. Loosen the tie rod locknuts ①.

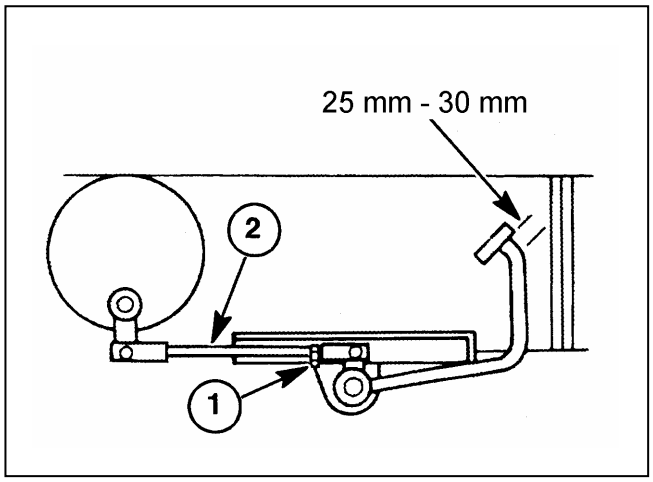
2. Adjust the tie rod tubes assemblies ② evenly as required to give 0 mm – 5 mm toe-in.

3. After the correct toe-in is obtained, tighten the tie rod locknuts.



BRAKE ADJUSTMENT

Whenever brake pedal travel becomes excessive, the pedal should be adjusted.



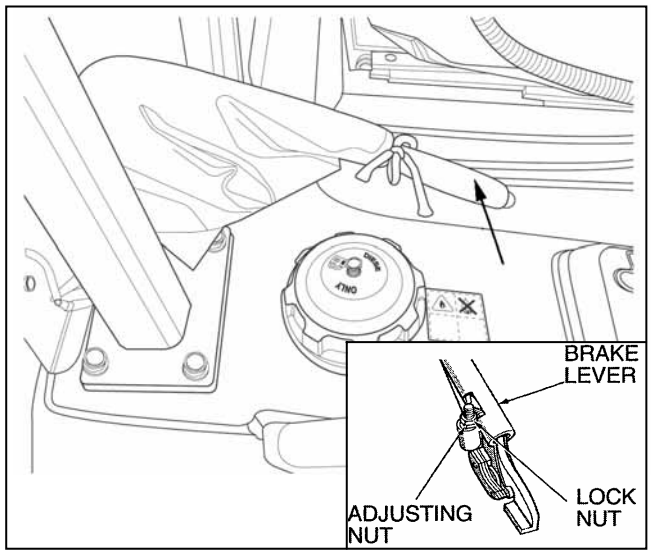
1. Loosen the locknut ① and rotate the brake rod ② until there is 25 - 30 mm of pedal free play. Lengthening the rod increases free play; shortening the rod decreases free play.

2. Test drive the tractor to ensure that the brake pedal travel is within suitable limits.

IMPORTANT: *Adjust left and right brakes evenly.*

PARKING BRAKE ADJUSTMENT

If the parking brake lever travel becomes excessive or the parking brake efficiency is reduced, the parking brake should be adjusted as follows:



1. Check and if necessary, adjust the foot brakes, as previously described.

2. Release the parking brake lever, Slacken the locknut and turn the adjusting nut so that both rear wheels are locked when the parking brake lever is applied 3-4 notches on the ratchet.

3. Ensure the rear wheels turn freely with the parking brake lever released.

4. Tighten the locknut without disturbing the adjusting nut.

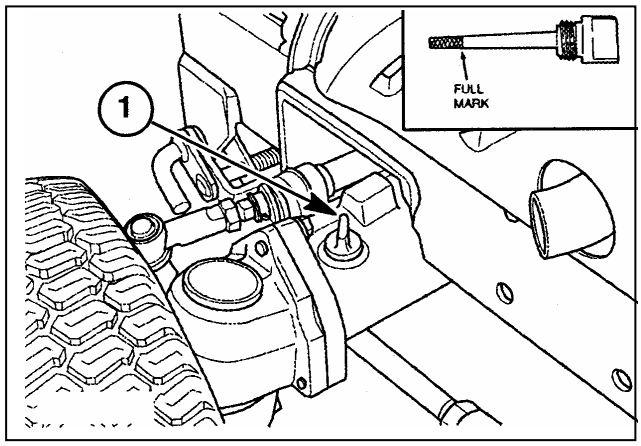
IMPORTANT: *Check the brake cables for corrosion, fraying or kinks. Ensure both inner cables move freely in the outer cables and are lubricated with a high quality grease. Replace any unserviceable cables.*

FRONT-WHEEL DRIVE

FRONT AXLE DIFFERENTIAL/FINAL REDUCTION GEAR CASE

Checking the Front Axle Differential/Final Reduction Gear Case Oil Levels

NOTE: *Check the oil level in the combined front axle differential/final reduction gear case after every 50 hours of operation.*



1. With the tractor standing level and the engine off, check the front axle oil level using the dipstick/filler plug ①.

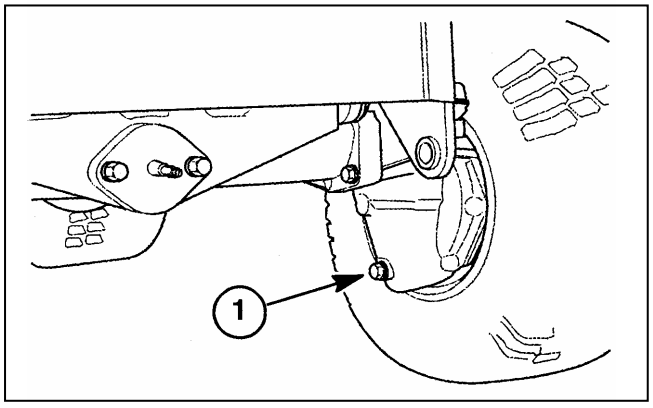
2. The oil is at the correct level when it reads between the 'full' mark and the lower end of the dipstick. If the oil level is low, add SAE 80 hydraulic oil through the combined dipstick/filler opening. Do not fill beyond the dipstick 'full' mark, or the front axle will be overfilled.

NOTE: *To obtain the correct oil level reading, do not screw the dipstick into the axle case, when checking the oil level.*

3. Reinstall the dipstick/filler plug.

Changing the Front Axle Differential/Final Reduction Gear Case Oil

NOTE: *The oil in the combined front axle differential/final reduction gear case should be changed after every 300 operating hours.*



1. Place a suitable container beneath the oil drain plugs ① located at the bottom of the final reduction gear housings on both sides of the tractor.

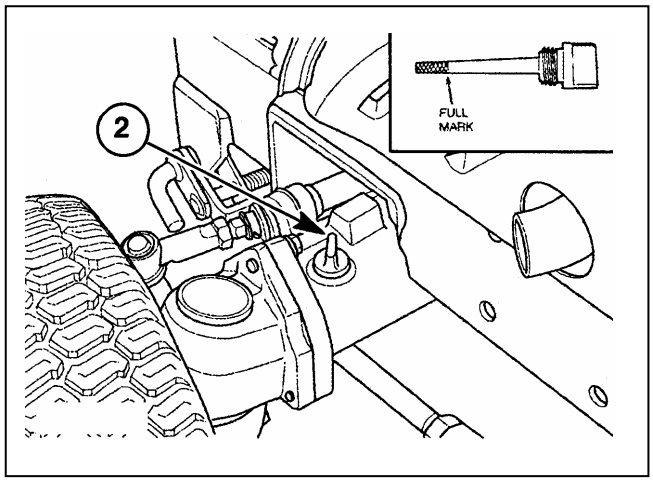
NOTE: *The capacity of the combined front axle differential/final reduction gear case is 2.0L of hydraulic oil.*

2. With the oil at normal operating temperature, remove the dipstick/filler plug ② and both drain plugs and allow the front axle case to completely drain.

3. After all the oil has drained from the axle case, replace both drain plugs and properly dispose of the used oil.

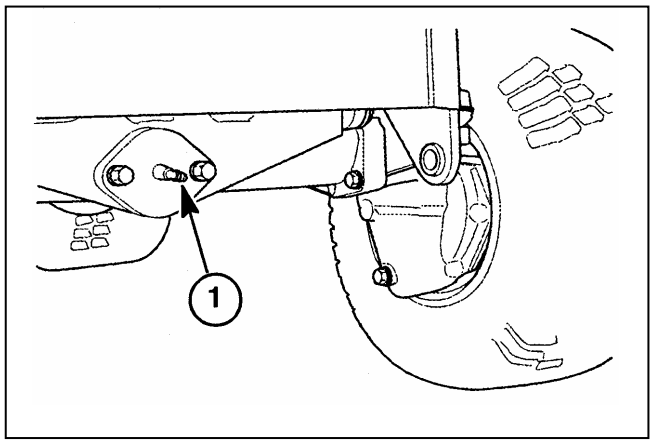
4. Refill the axle case with SAE 80 hydraulic oil until the oil level shows between the 'full' mark and lower end of the dipstick. Reinstall the dipstick/filler plug.

NOTE: *To obtain the correct oil level reading, do not screw the dipstick into the axle case when checking the oil level.*



FRONT AXLE PIVOT/STANDARD FWD AXLE

NOTE: *The center housing pivot point ① should be greased after every 50 hours of operation under normal conditions. Under extremely dirty conditions, lubrication should be carried out more frequently than every 50 hours. Use a good quality, multipurpose, lithium-base grease.*



TRACTOR STORAGE

Below is a list of protective measures which should be taken if your tractor is to be stored for an extended period of time:

1. Thoroughly clean the tractor. Use touch-up paint where necessary to prevent rust.

2. Check the tractor for worn or damaged parts. Install new parts as required.

3. Raise the lift arms hydraulically to their fullest raised position so that the lift piston is in a fully extended position. This fills the cylinder with oil and protects the cylinder wall surfaces from corrosion.

4. Lubricate the tractor.

5. Fill the fuel tank with No. 1 diesel fuel.

IMPORTANT: *Do not use No. 2 diesel fuel for winter storage because of wax separation and setting at low temperature.*

6. Open the drain valve of the radiator and engine block. Flush the system, close the drain valves, and fill with a 50/50 solution of permanent antifreeze and clear water.

7. Remove the battery and clean it thoroughly. Be sure that it is fully charged and that the electrolyte is at the proper level. Store the battery in a cool, dry place above freezing temperature, and charge it periodically during storage.

8. Place blocking under the tractor axles to remove the weight from the tires.

9. Cover the exhaust pipe opening.

Tractors which have been placed in storage should be completely serviced in the following manner before using:

1. Inflate the tires to the recommended pressures and remove the blocking.

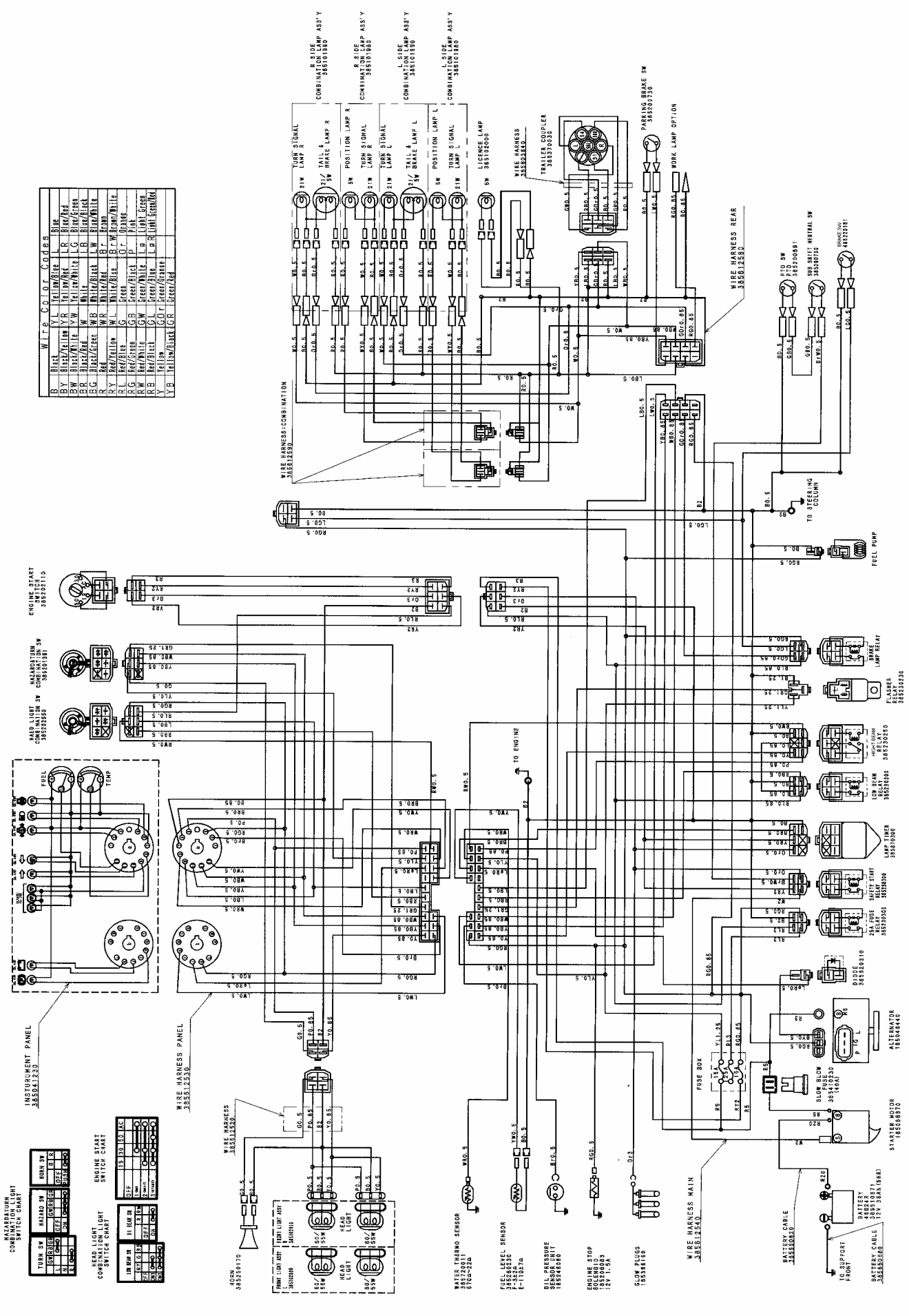
2. Check the oil level in the engine crankcase, power steering reservoir, the common sump (for the hydraulic lift, transmission, and rear axle), and the optional front-wheel drive axle.

3. Install a fully charged battery.

4. Check the cooling system for the proper level (50/50 solution of antifreeze and clear water).

5. Start the engine and allow it to idle a few minutes. Ensure the engine is receiving lubrication and that each control is functioning correctly.

6. Drive the tractor without a load and check to make sure it is operating satisfactorily.


Wire Color Codes
B Black
BY Black/Yellow
BW Black/White
BR Black/Red
BG Black/Green
R Red
RY Red/Yellow
RL Red/Blue
RG Red/Green
RW Red/White
RB Red/Black
Y Yellow
YB Yellow/Black
YL Yellow/Blue
YR Yellow/Red
YW Yellow/White
W White
WB White/Black
WR White/Red
WL White/Blue
G Green
GB Green/Black
GW Green/White
GL Green/Blue
GOr Green/Orange
GR Green/Red
L Blue
LR Blue/Red
LG Blue/Green
LB Blue/Black
LW Blue/White
Br Brown
BrW Brown/White
Or Orange
P Pink
LG Light Green
LB Light Blue
LGR Light Green/Red
R SIDE COMBINATION LAMP ASS'Y 38510/1980
L SIDE COMBINATION LAMP ASS'Y 38510/1990
TURN SIGNAL LAMP R
TAIL & BRAKE LAMP R
POSITION LAMP R
TURN SIGNAL LAMP L
TAIL & BRAKE LAMP L
POSITION LAMP L
LICENCE LAMP 38510/2000
WIRE HARNESS 38582/2840
TRAILER COUPLER 38537/0030
PARKING BRAKE SW 38520/1730
WORK LAMP OPTION
WIRE HARNESS:COMBINATION 38581/2380
WIRE HARNESS REAR 38581/2580
PTO SW 38520/0091
SUB SHIFT NEUTRAL SW 38580/0710
TO STEERING COLUMN
FUEL PUMP
ENGINE START SWITCH 38520/2110
HAZARD/TURN COMBINATION SW 38520/1381
HEAD LIGHT COMBINATION SW 38520/2080
BRAKE LAMP RELAY
FLASHER UNIT 38523/0230
HIGH BEAM RELAY 38520/2150
LOW BEAM RELAY 38520/0300
LAMP TIMER 38540/0300
SAFETY START RELAY 38520/0350
20A FUSE 38520/0500
DIODE 38520/0310
ALTERNATOR 1858048440
FUEL
TEMP
TO ENGINE
INSTRUMENT PANEL 38504/1230
WIRE HARNESS PANEL 38561/2530
WIRE HARNESS 38561/2520
FUSE BOX
SLOW BLOW FUSE 38540/0230 (40A)
STARTER MOTOR 1858088870
HAZARD/TURN COMBINATION LIGHT SWITCH CHART
TURN SW
HAZARD SW
HORN SW
ENGINE START SWITCH CHART
HEAD LIGHT COMBINATION LIGHT SWITCH CHART
HI BEAM SW
LOW BEAM SW
HORN 38520/0170
FRONT LIGHT ASSY 38510/0600
HEAD LIGHT 60W 55W
HEAD LIGHT 65W 55W
WATER THERMO SENSOR 38520/2211 38520/2214
FUEL LEVEL SENSOR 38520/2230 E-13420 E-11027a
OIL PRESSURE SENSOR UNIT 1859048080
ENGINE STOP SOLENOID 1858000083 12V 1.5A
GLOW PLUGS 1858086160
WIRE HARNESS MAIN 38581/2540
BATTERY CABLE 38582/0020
BATTERY 38581/0071 12V 36Ah(10HR)
TO SUPPORT FRONT
BATTERY CABLE 38582/0080

SECTION 4
SXM54, SXM60 MOWER DECK

INTRODUCTION

TO THE OWNER & OPERATOR

Please read this entire section before operating, adjusting or servicing your SHIBAURA SXM54 or SXM60 Mower deck.

The SXM54 and SXM60 mower decks are designed to give many years of satisfactory service in grass mowing operations. These mowers are not designed to be used for any other purpose. Successful operation and long mower life depends on proper maintenance and correct operating technique.

The information in this section will provide safe operating techniques, proper maintenance procedures, service and repair procedures and parts identification for your SHIBAURA mower deck. Please read this section completely, following all instructions. Keep this manual handy for future reference.

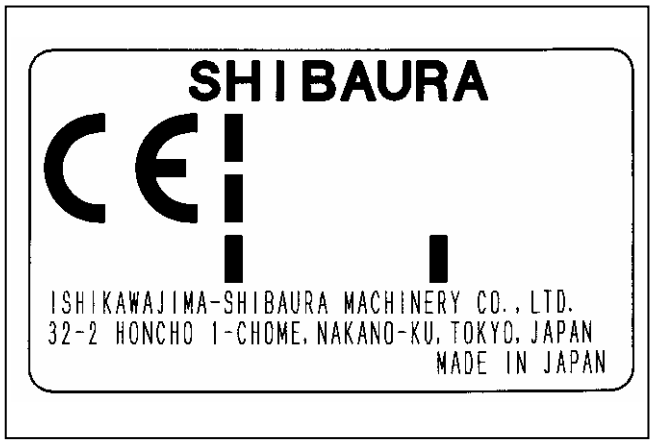
All references to right, left, forward or rearward, used in this section refer to that direction when seated on the tractor seat facing forward.

Should any assistance be required in understanding any section of this manual, contact your SHIBAURA Dealer.

IDENTIFICATION NUMBERS

Locate the Product Identification Number plate and record the numbers from it on the pictured plate below. Always refer to this information when requesting repair parts or dealer service.

Contact your SHIBAURA Dealer for authorized service parts. Substitute repair parts will void the product warranty, and will not meet the standards required for safe operation.



METRIC BOLT TORQUE SPECIFICATION

Bolt Size	Grade No.	Coarse Thread			Fine Thread		
		Pitch (mm)	Pounds-Feet	Newton Meters	Pitch (mm)	Pounds-Feet	Newton-Meters
M6	4T	1.0	3.6 – 5.1	4.9 – 6.9	–	–	–
	7T		6.1 – 8.3	8.3 – 11.3			
	10T		8.7 – 11.6	11.8 – 15.7			
M8	4T	1.25	9.4 – 12.3	12.7 – 16.7	1.0	11.2 – 14.8	15.2 – 20.1
	7T		16.6 – 21.0	22.6 – 28.4		19.5 – 25.3	26.5 – 34.3
	10T		21.0 – 26.8	28.4 – 36.3		22.4 – 29.7	30.4 – 40.2
M10	4T	1.5	18.8 – 24.6	25.5 – 33.3	1.25	21.0 – 26.8	28.4 – 36.3
	7T		32.5 – 41.2	44.1 – 55.9		36.2 – 46.3	49.0 – 62.8
	10T		39.8 – 51.4	53.9 – 69.6		42.7 – 54.2	57.9 – 73.5
M12	4T	1.75	27.5 – 34.7	37.3 – 47.1	1.25	31.8 – 40.5	43.1 – 54.9
	7T		48.5 – 61.5	65.7 – 83.4		55.0 – 69.4	74.5 – 94.1
	10T		68.0 – 85.4	92.2 – 116		73.1 – 93.3	99.0 – 127
M14	4T	2.0	46.3 – 59.3	62.8 – 80.4	1.5	51.4 – 64.4	69.6 – 87.3
	7T		76.7 – 96.9	104 – 131		86.1 – 109	117 – 148
	11T		102 - 129	139 – 175		108 – 137	147 – 186
M16	4T	2.0	63.6 – 81.0	86.3 – 110	1.5	67.3 – 84.6	91.2 – 115
	7T		110 - 136	149 – 184		116 – 142	157 – 192
	11T		152 - 188	206 – 255		163 – 199	221 – 270
M18	4T	2.0	83.9 - 104	114 – 141	1.5	96.9 – 120	131 – 163
	7T		145 - 174	196 – 235		170 – 206	230 – 279
	11T		203 - 246	275 – 333		221 – 271	299 – 368
M20	4T	2.5	106 - 132	144 – 179	1.5	127 – 156	172 – 211
	7T		177 - 213	240 – 289		203 – 246	275 – 333
	11T		268 - 325	363 – 441		293 – 358	397 – 485

A careful operator is the best operator. Accidents can be avoided by observing certain safety precautions. Read and understand these precautions before operating the Mower. This equipment should be operated only by those who have been trained in its safe use.

THE MOWER

Know and understand all mower instructions and Safety Precautions before assembly, service, or operation. Also read and understand all Safety Precautions in the Tractor Operator's Manual.

Keep the tractor and mower in good operating condition at all times.

Always keep all shields and guards securely in place.

Make sure all fastening hardware is properly tightened before operating the tractor and mower.

Keep all Safety Decals clean and free of dirt and grime. Always replace any Safety Decals that become damaged, lost, painted over, or otherwise become illegible. Replace all Safety Decals when repainting the mower.

MOWER OPERATION

NEVER operate the mower with the discharge deflector in the raised position.

DO NOT permit anyone but the operator to ride on the tractor or mower. There is no safe place on this equipment for passengers.

Clear the area of people, pets, and all visible debris before mowing.

Mow only during daylight hours, or when the area is well lit artificially.

To avoid the possibility of injury from flying debris, NEVER operate the mower raised into the transport position.

Always keep mower discharge directed away from people or animals, which could be injured, and away from objects that could be damaged, by debris thrown by the mowing blades.

Stop and inspect all parts of the mower after striking any foreign object. Repair any damage before resuming mowing operations.

Disengage power to the mower and make sure the area behind the tractor and mower is clear before backing up. Always slow down when backing or turning.

The operator should NEVER leave the tractor seat with the mower blades rotating, with the tractor in motion, or when the tractor engine is running.

Always be alert for vehicle traffic when crossing or mowing near roadways. Avoid bystanders when mowing on or near public facilities.

THE TRACTOR

Always use an approved Roll Over Protective Structure (ROPS) for safe operation. Overturning a tractor, without a ROPS, can result in serious injury or death. If your tractor is not equipped with a ROPS, see your SHIBAURA Dealer.

NEVER allow an open flame near the fuel tank or tractor battery.

WHEN YOU SEE THIS SYMBOL IT MEANS:

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

OPERATING THE TRACTOR & MOWER

Use the hand holds and step platforms when mounting and dismounting the tractor to prevent falling. Always keep steps and platforms clean and free of mud or other debris.

The operator MUST remain in the tractor seat at all times while mowing, transporting, or anytime the tractor engine is running.

NEVER start the engine while-standing beside the tractor. The operator MUST sit in the tractor seat when starting the engine.

NEVER run the engine in a closed building without adequate ventilation. Exhaust fumes are very dangerous and can cause permanent injury or death.

Use extreme care when operating on slopes to maintain equipment stability.

Keep the tractor in gear when traveling downhill.

Install tractor wheel weights to increase stability when operating on slopes. Consult your SHIBAURA Dealer on ballasting requirements for your equipment.

To avoid loss of control, and to prevent over-turning the tractor and mower, always mow up and down slopes, never across. DO NOT operate on steep slopes.

Always bring the tractor to a complete stop, lower the mower deck to ground contact, disengage power to the mower, set the parking brake, shut off the engine and remove the key, before dismounting from the tractor.

NEVER park the tractor on an incline.

SERVICING THE MOWER

Keep the tractor and mower clean. Grease, dry debris and grass buildup can cause fires, damaging the equipment and causing serious injury to yourself or others.

Check for and replace or repair missing, loose, or damaged parts on the mower. A defective mower could cause injury to another operator who is unaware of a potential problem.

To avoid injury, do not clean, adjust, unclog, or service the mower when the engine is running.

Do not work under the raised tractor or mower deck unless it is securely supported by a hoist, floor jack and jackstands.

Make sure all hoists, floor jacks and jackstands are in good working order and have sufficient capacity to support the elevated equipment, before repair, adjustment, or lubrication of the tractor or mower.

Inspect the mowing blade retainer nuts daily, or whenever a blade has been removed. Torque is 150 - 177 N·m. These nuts have right hand threads.

To avoid injury when handling mowing blades, wear leather gloves, or wrap the blades in the area where they will be held.

Do not modify or alter or permit anyone else to modify or alter the mower, or any of its components or operating functions. If in doubt on modifications, see your SHIBAURA Dealer.

WHEN YOU SEE THIS SYMBOL ⚠ IT MEANS:

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

SAFETY DECALS

CARE OF SAFETY DECALS

1. Keep safety decals clean and free of dirt and debris.

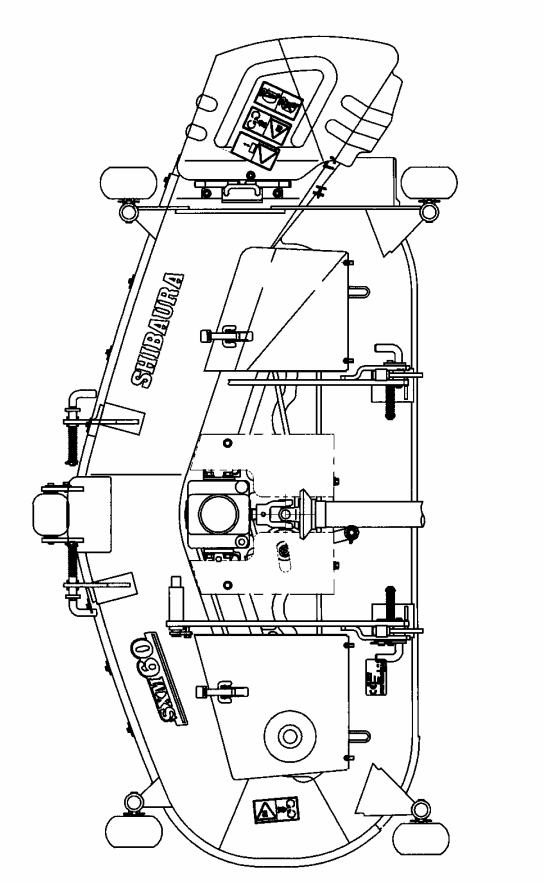
2. Clean safety decals with mild soap and water and dry with a soft cloth.

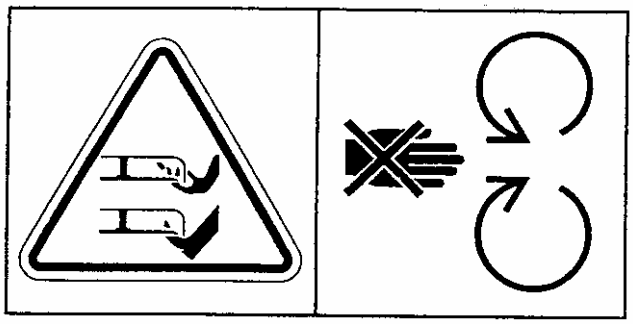
3. Replace any damaged, missing or illegible safety decals with new decals obtained from your SHIBAURA Dealer.

4. If a component with safety decals affixed is to be replaced, make sure new safety decals are attached in the same locations on the replaced component.

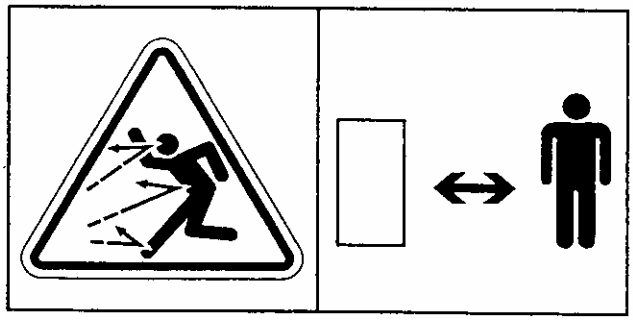
5. Install new safety decals by applying on a clean dry surface, working air bubbles out to the edges.

DECAL LOCATIONS

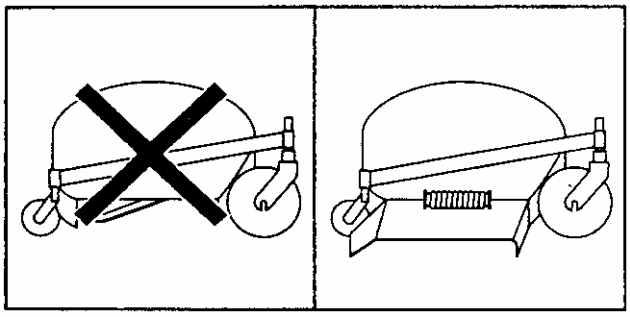




Decal: **DANGER**
PART NO: 690360330
LOCATION: Top of deck discharge chute



Decal: **DANGER**
PART NO: 690360340
LOCATION: Top of discharge chute



Decal: **DANGER**
PART NO: 690360360
LOCATION: Top of discharge chute

OPERATING INSTRUCTIONS

GENERAL INFORMATION

The safe operation of the Tractor and Mower is the responsibility of the operator. The operator MUST be familiar with tractor and mower controls, how they work, and all Safety Precautions BEFORE starting operation. This mower is designed to be mounted on applicable tractors as a finish cut mower.

IMPORTANT: *To avoid damage to the mower, re-torque ALL fastening hardware, including blade and spindle pulley retaining nuts, after the first hour of mowing operation. See page 4-26 for blade servicing information.*

⚠ CAUTION ⚠

Inspect the mowing blade retainer bolts and spindle nuts daily, or whenever a blade has been removed.

TIPS FOR EFFICIENT MOWING

Blade sharpness affects the appearance of the mowed lawn. A dull or damaged blade will cause grass to appear torn or beaten off, rather than cut cleanly. Mowing blades should be checked regularly and kept sharp to insure the best lawn appearance.

Tractor engine speed while mowing should be at maximum rated RPM. This will insure proper blade speed for effective cutting and discharge of grass clippings.

Travel speed greatly effects mowing performance. The operator must use his own best judgement for the ground speed required for encountered mowing conditions. Always use a lower tractor transmission speed for slower mowing, rather than lowering engine RPM.

⚠ WARNING ⚠

Do not permit anyone but the operator to ride on the tractor or mower. There is no safe place on this equipment for passengers.

Mow often! Do not wait for the grass to get too tall. Short grass clippings will disperse better and deteriorate faster.

⚠ CAUTION ⚠

Clear the area of all visible debris before beginning mowing operations.

Mowing areas with tall grass or weeds may require cutting at 10 cm (maximum) height of cut. After mowing once, recut the entire area with the mower reset to the desired final height of cut.

⚠ WARNING ⚠

Always keep mower discharge directed away from people or animals, which could be injured, and away from objects that could be damaged, by debris thrown by the mower blades.

The gauge wheels on either side of the front of the mowing deck serve as convenient mowing guides. When mowing, position the mower so the gauge wheel overlaps the edge of the strip previously cut. This will assure full mowing coverage.

⚠ CAUTION ⚠

Mow only during daylight hours, or when the area is well lit artificially.

When transporting, always disengage the power to the mower.

⚠ WARNING ⚠

To avoid the possibility of injury from flying debris, never operate the mower in the raised transport position.

UNEVEN TERRAIN

Pre-plan mowing over uneven terrain so the grass will be dry, minimizing wheel slippage and spinning, which will damage the turf.

⚠ WARNING ⚠

To avoid loss of control, and to prevent overturning the tractor and mower, always mow up and down slopes, never across.

Pass diagonally through sharp dips. Avoid sharp drop-offs completely to prevent "hanging-up" the tractor and mower.

⚠ WARNING ⚠

Keep the tractor in gear when traveling downhill.

Before mowing, check the area to determine the best procedure. Consider the grass type and height, and the type of uneven terrain on which the mowing is to take place.

⚠ DANGER ⚠

Always use an approved roll over protective structure (POPS) for safe operation. Overturning a tractor, without a ROPS, can result in serious injury or death. If your tractor is not equipped with a ROPS, see your SHIBAURA dealer.

Avoid sudden starts and stops while traveling up or down hill, and slow the ground speed while turning.

GRASS DISCHARGE

SXM54 and SXM60 mower decks have been designed to provide maximum air flow for an even discharge of grass clippings. When mowing tall, or lush grasses, select a lower tractor transmission speed, or reduce the width of cut, for the best discharge efficiency.

For the best lawn appearance, do not mow when the grass is wet or heavy with dew. Wet grass could plug the bottom of the mower deck, creating an unnatural load through the blades and spindles, possibly damaging the mower deck belt. Wet grass will also leave unsightly clumps on the lawn.

If the mower should become clogged, back the unit out of the uncut grass and try to clear it by engaging and disengaging the PTO with the deck raised. If the mower will not clear itself, raise the deck, shut off the engine, set the parking brake, lock the deck in the transport position, and clean the bottom of the deck with a scraper.

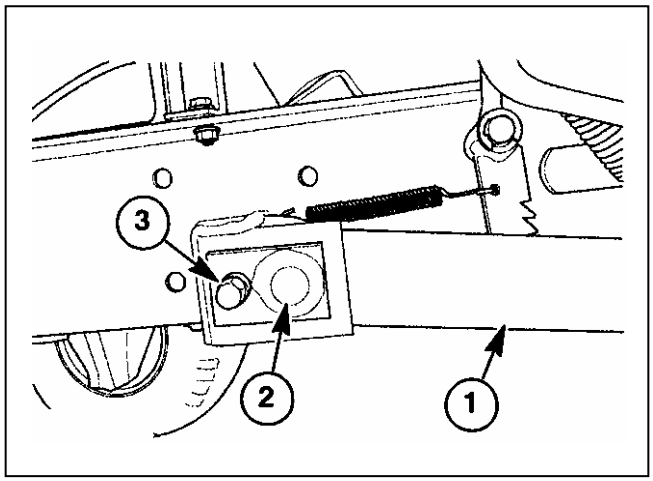
⚠ WARNING ⚠

The operator should never leave the tractor seat with the mower blades rotating, with the tractor in motion, or when the tractor engine is running.

TRACTOR PREPARATION

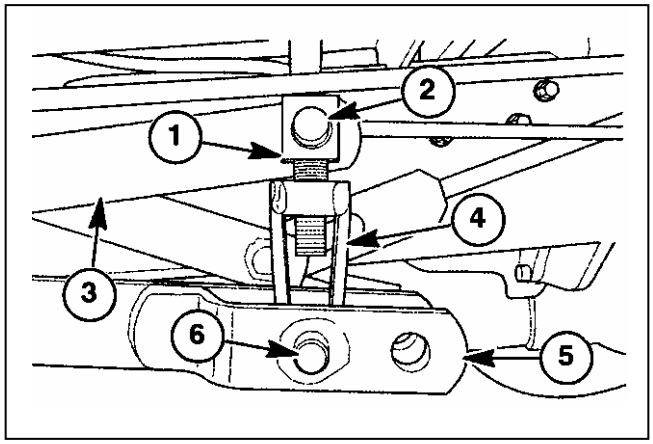
1. Install the left rear link ① on the left side of the tractor.

2. Install the pin ② through the frame and rear link. Secure pin with the M8×1.25×20 bolt ③.

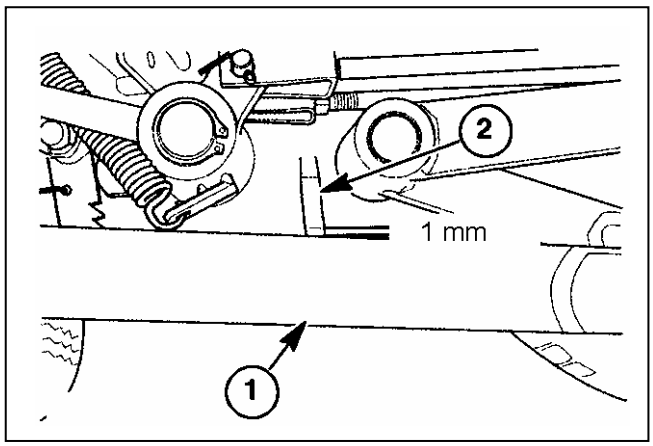


3. Place the adjuster ① over the pin ② on the PTO lift arm ③.

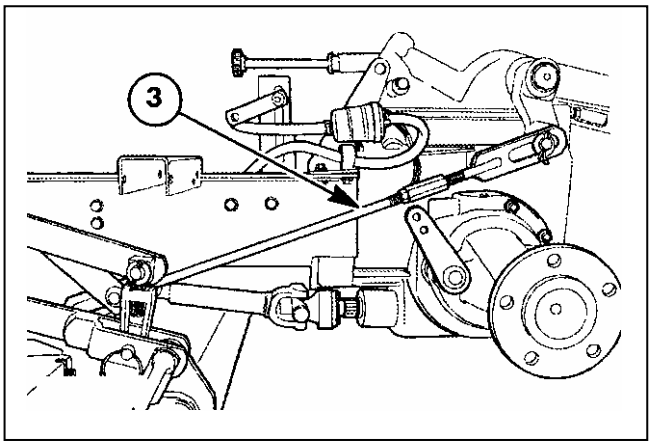
4. Position the lower part of the adjuster ④ in the rear of the lift link ⑤ and secure with the pin ⑥ from the inside towards the outside.



5. With the 3 PT control lever in the full "UP" position, the clearance between the link ① and stop ② should be 1 mm.



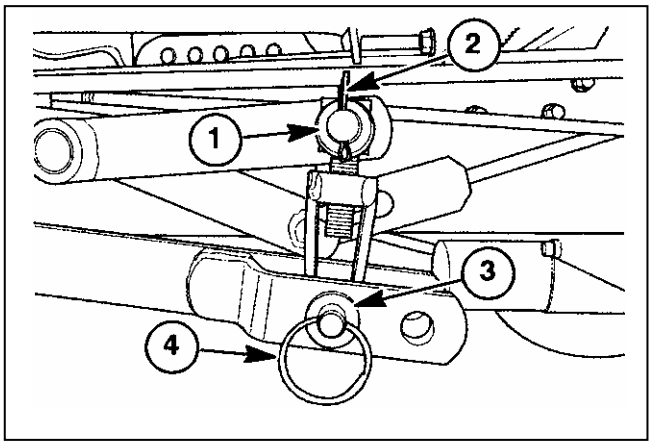
If clearance is not correct adjust primary link ③.



6. With the proper clearance set between the link arm and stop, secure the top of the adjuster with a M16 flat washer ① and cotter pin ②.

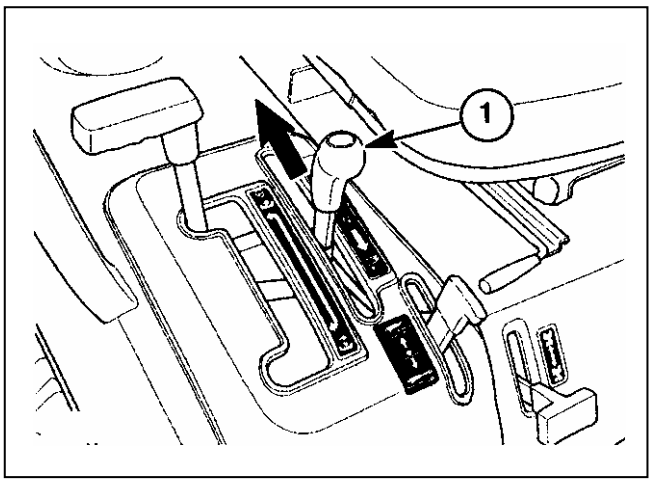
7. Secure the lower part of the adjuster to the link arm with a M16 flat washer ③ and wire ring ④.

8. Repeat steps 1 - 7 for the right side, rear link.



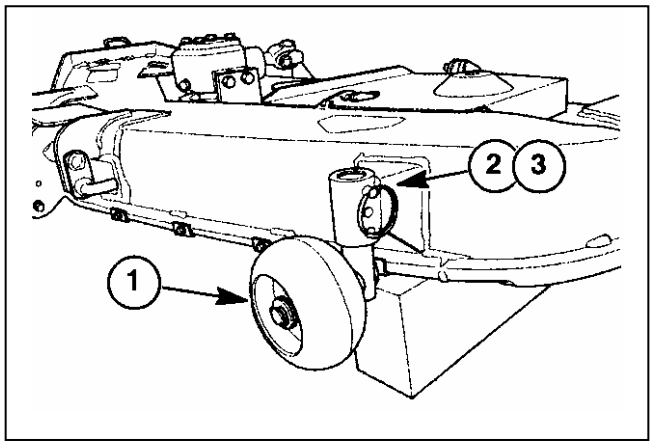
MOUNTING THE MOWER DECK TO THE TRACTOR

1. Start the tractor and pull the 3 PT control lever ① rearward to lift the 3 PT linkage all the way up.



2. Remove and re-install the four gauge wheels ① in the sideways position.

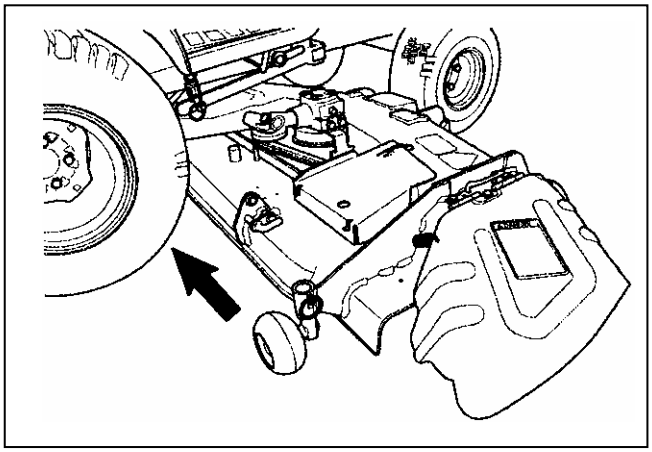
3. Secure the wheel spindles with the clevis pins ② and clips ③.



⚠ CAUTION ⚠

When rolling the mower deck under the tractor, be very careful not to strike the hydraulic filter with the mower deck.

4. Roll the mower deck under the tractor and position for connection to the lift linkage.

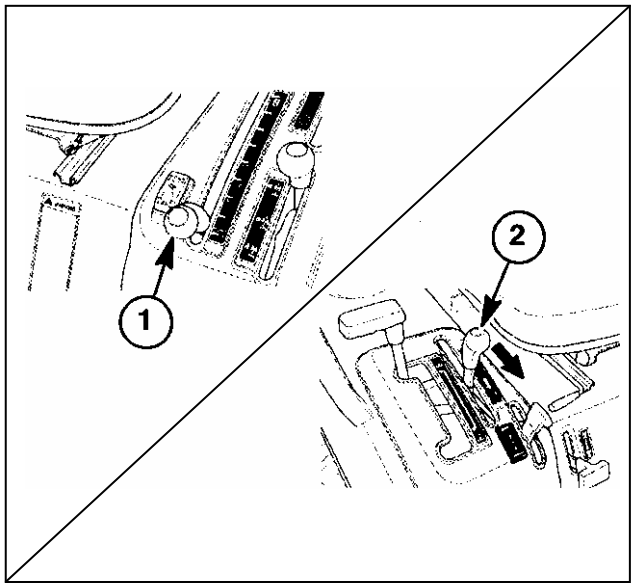


5. Place the mower height adjustment lever ① in the 1" cutting height position.

6. Start the engine on the tractor.

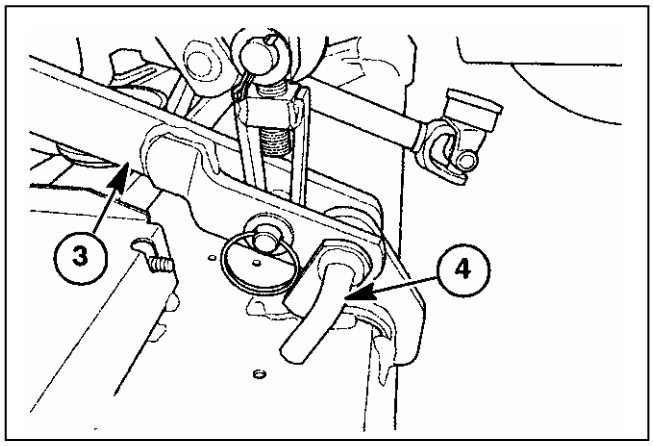
7. Shift the 3 PT lever ② forward, to the "lower" position.

8. Turn the engine off.



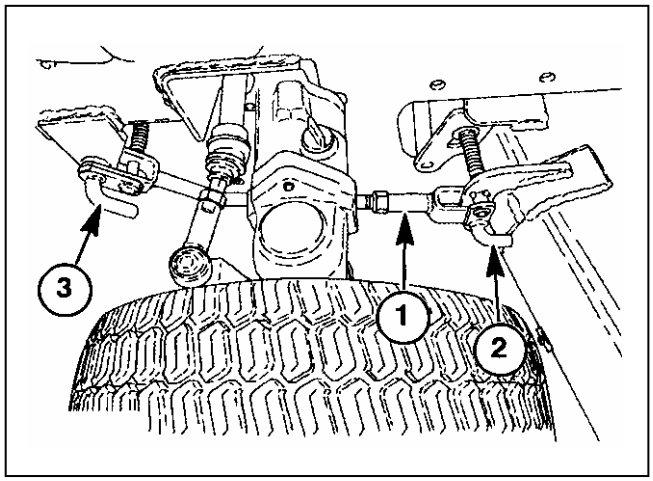
9. Connect the rear linkage ③ to the deck using the spring-loaded handle ④.

10. Repeat for the opposite side.



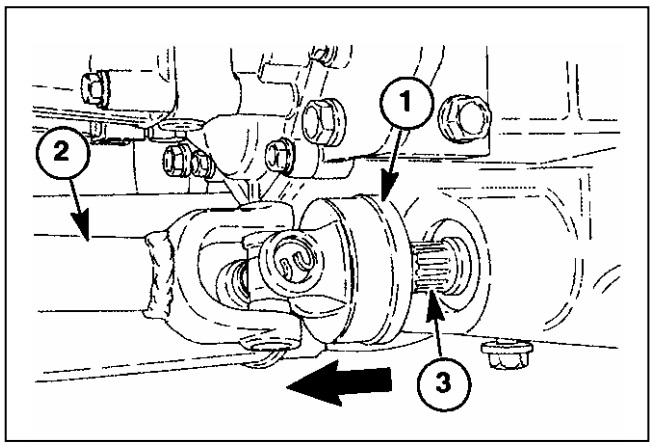
11. Connect the front linkage ① to the mower deck using the spring-loaded handle ②. Connect the opposite end of the front linkage to the tractor using the spring loaded handle ③.

12. Repeat for the opposite side.



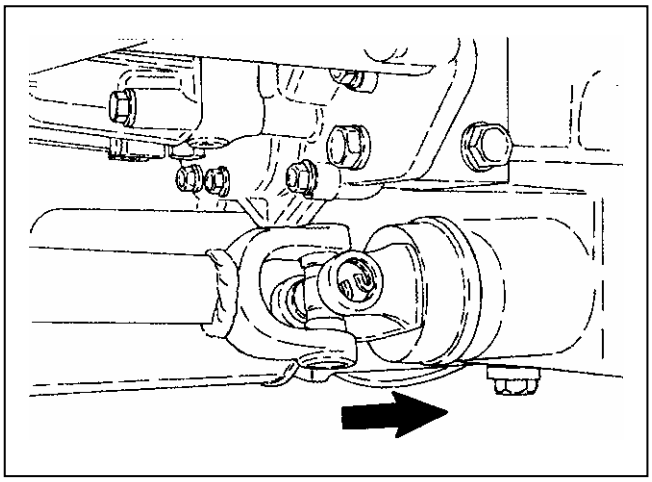
13. Remove the PTO cap from the PTO shaft.

14. Pull the driveshaft locking collar ① towards the front of the tractor and slide the driveshaft ② onto the PTO shaft ③.



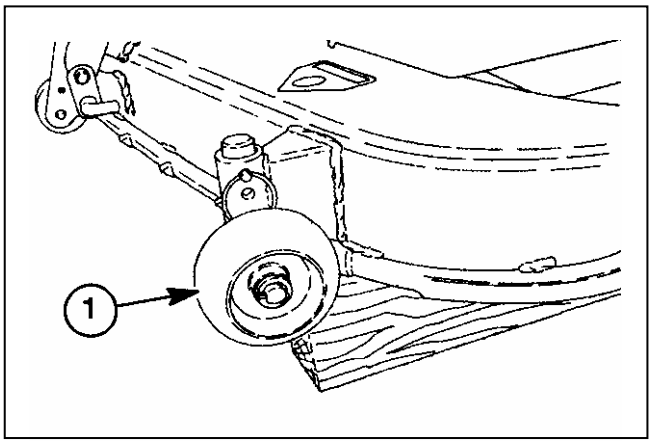
15. Release the locking collar and push the driveshaft onto the PTO shaft, securing the driveshaft to the PTO shaft.

16. **IMPORTANT: Be sure locking collar is locked onto PTO shaft prior to operating the mower deck.**



17. Remove and re-install the four gauge wheels ① to the operating position.

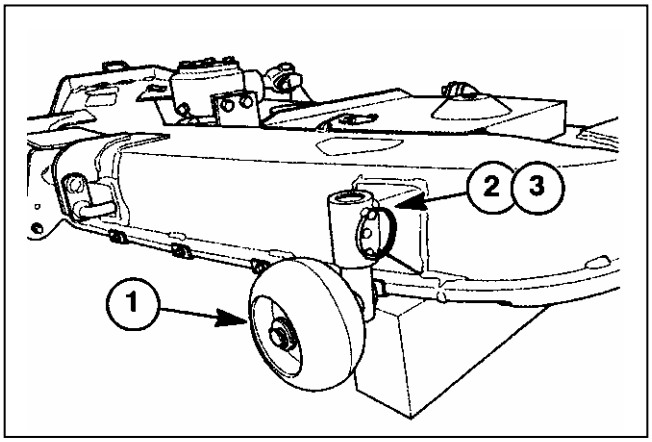
NOTE: *See Mower Deck Adjustment section for proper position and adjustment of gauge wheels prior to operation.*



DISMOUNTING THE MOWER DECK FROM THE TRACTOR

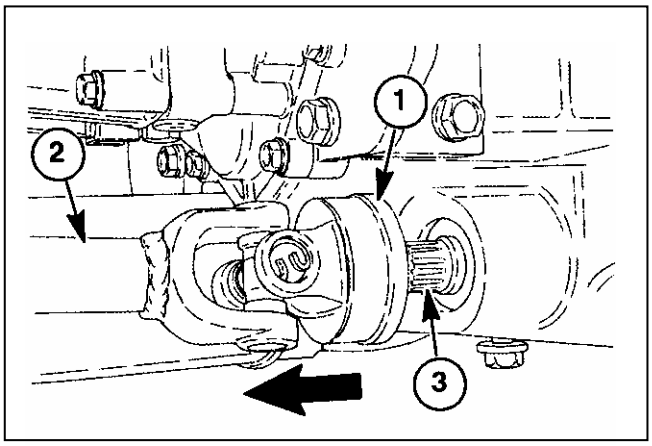
1. Remove and re-install the four gauge wheels ① in the sideways position.

2. Secure the wheel spindles with the clevis pins ② and clips ③.



3. Pull the driveshaft locking collar ① towards the front of the tractor and slide the driveshaft ② off the PTO shaft ③.

4. Install the PTO cap on the PTO shaft.

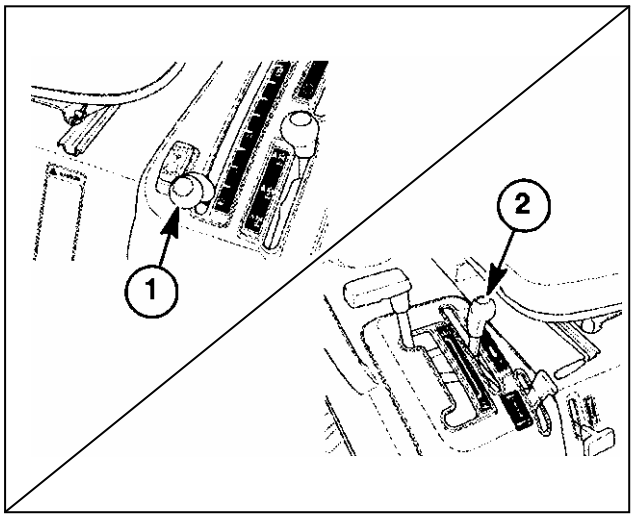


5. Place the mower height adjustment lever ① in the 1" cutting height position.

6. Start the engine on the tractor.

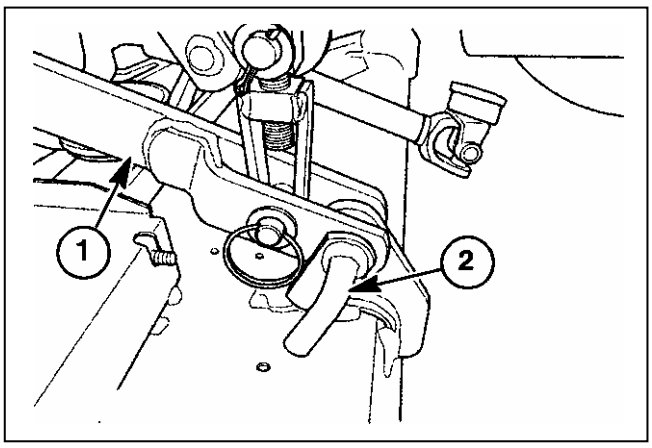
7. Shift the 3 PT lever ② to the "lower" position.

8. Turn the engine off.



9. Disconnect the rear linkage ① from the deck using the spring-loaded handle ②.

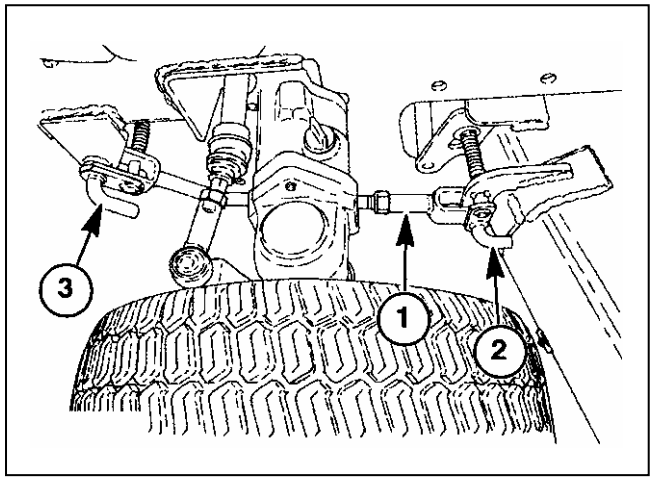
10. Repeat for the opposite side.



11. Disconnect the front linkage ① from the mower deck using the spring-loaded handle ②.

12. Disconnect the front linkage from the tractor using the spring loaded handle ③.

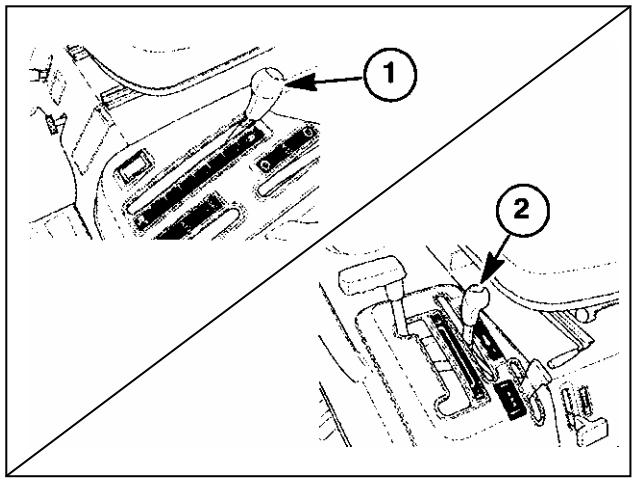
13. Repeat for the opposite side.



14. Start the engine on the tractor and place the 3 PT hitch control lever ① in the "raise" position.

15. Place the height control lever ② in the "LOCK" position.

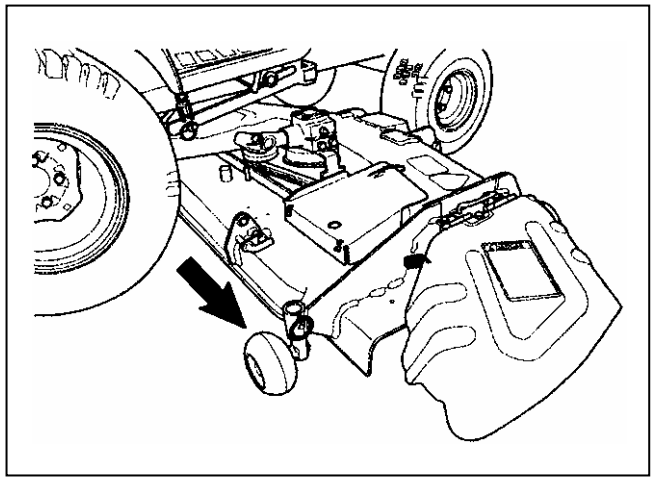
16. Stop the engine on the tractor.



⚠ CAUTION ⚠

When rolling the mower deck from under the tractor, be very careful not to strike the hydraulic filter with the mower deck.

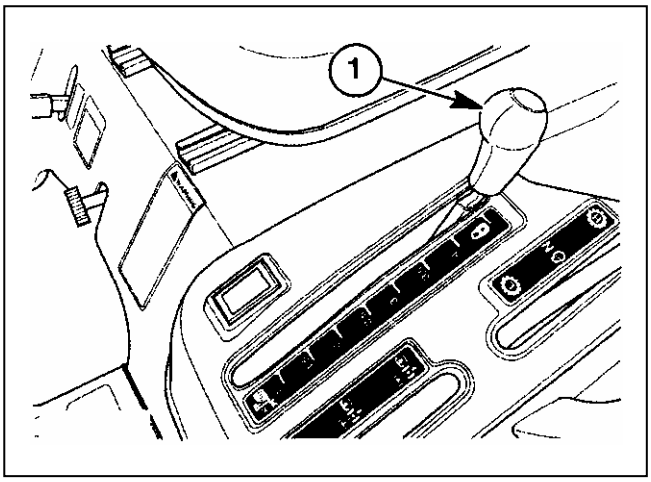
17. Carefully roll the mower deck out from under the tractor.



MOWER TRANSPORT LOCK

The tractor is equipped with a transport lock feature, allowing the mower deck to be placed in the raised position and locked, while the 3PT hitch remains fully functional.

To engage the transport lock feature, start the tractor and raise the mower deck. With the tractor engine running, place the cutting height control lever ① in the "LOCK" position. The 3 PT hitch is now able to be used with the mower deck locked in the "UP" or transport position.



MOWER DECK LEVELING

After mounting the mower deck to the tractor, the deck must be leveled from side to side and front to back. Follow the steps in this instruction to properly level the mower deck.

Side To Side Leveling

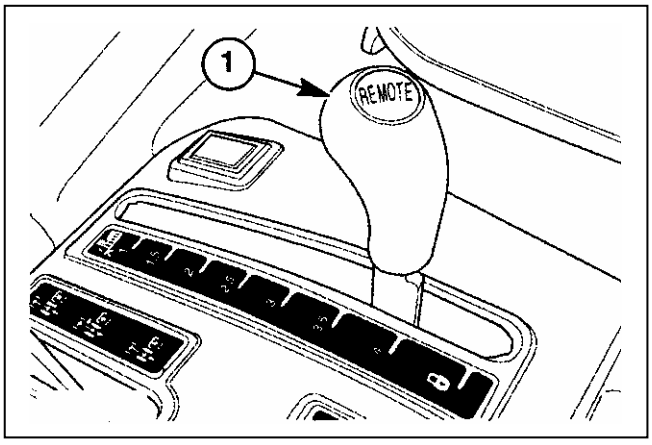
⚠ WARNING ⚠

To avoid personal injury, park the tractor on a firm, flat and level surface. Set the parking brake. Stop the engine and remove the key from the key switch.

IMPORTANT: *Before any leveling adjustments are performed, it is critical to verify tractor tire pressures are to specification.*

1. Check the air pressure in the tractor tires, Adjust air pressure evenly in all fourtires to 80 - 140 kPa.

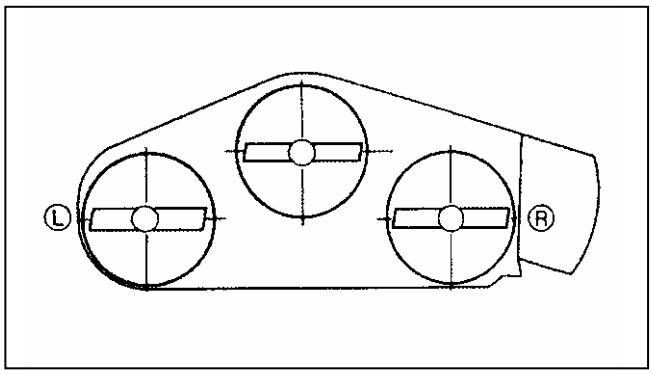
2. Place the cutting height control lever ① in the 4" cutting position.



3. Start the tractor and lower the mower deck by placing the PTO lever in the "down" (forward) position.

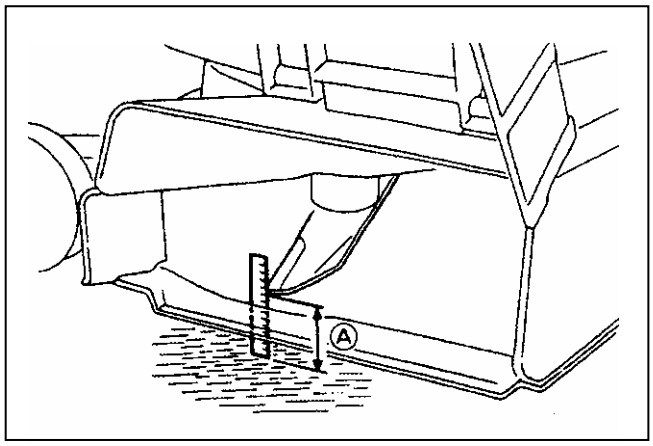
4. Stop the engine and remove the key from the key switch.

5. Rotate the mower blades by hand, to a position parallel with the tractor axles.

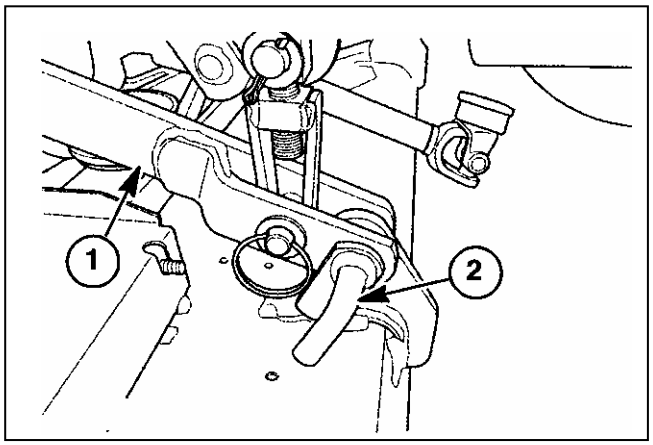


6. Measure the left and right blade outer ends.

7. The difference between the left and right blades should not be more than 3 mm. If the difference is more than 3 mm, proceed to the next step to adjust.



8. With the deck lowered in the 4" cutting height position, disconnect the rear links ① from the mower deck using the spring loaded handle ②.



9. Remove the cotter pin ① and M16 flat washer ② from the lift arm.

10. Remove the wire ring ④ M16 flat washer ③ and pin ⑤ from the link arm.

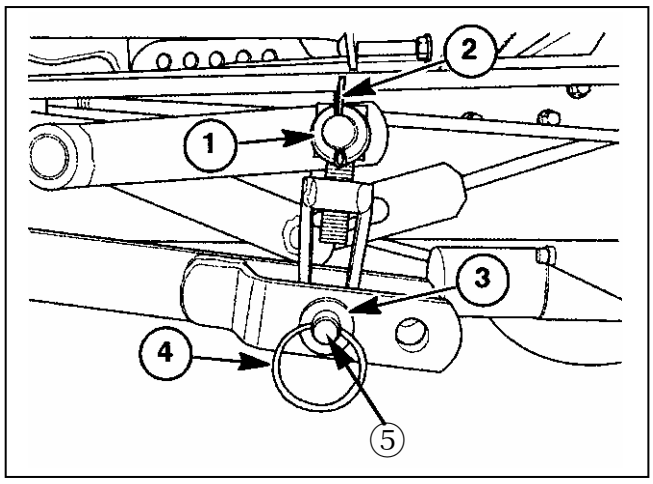
11. Slide the adjuster off the pin on the lift arm and adjust as follows:

    - Lengthen the adjuster on the side with the high blade or;
    - Shorten the adjuster on the side with the low blade.

12. Reinstall the adjuster and secure with washers, cotter pin and wire clip.

13. Measure blade height on left and right side.

14. Repeat steps 9-13 until blades are within 3 mm.



Front To Back Leveling

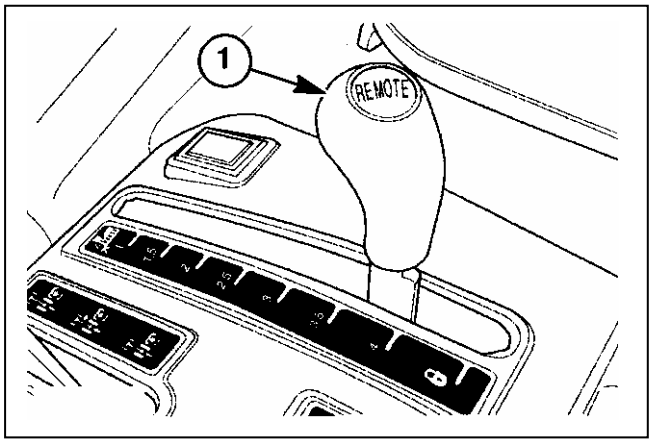
⚠ WARNING ⚠

To avoid personal injury, park the tractor on a firm, flat and level surface. Set the parking brake. Stop the engine and remove the key from the key switch.

IMPORTANT: *Before any leveling adjustments are performed, it is critical to verify tractor tire pressures are to specification.*

1. Check the air pressure in the tractor tires, Adjust air pressure evenly in all fourtires to 80 -140 kPa.

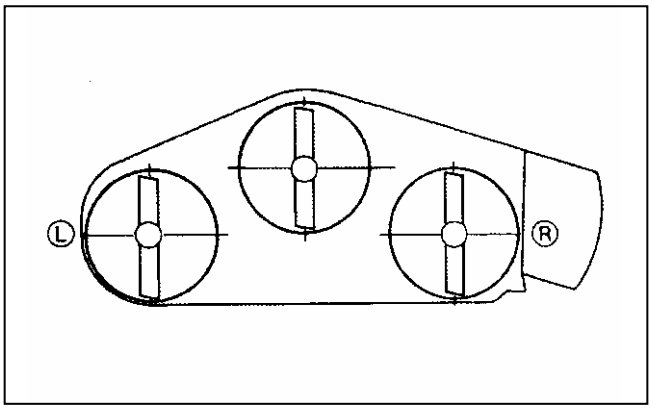
2. Place the cutting height control lever ① in the 4" cutting position.



3. Start the tractor and lower the mower deck by placing the PTO lever in the "down" (forward) position.

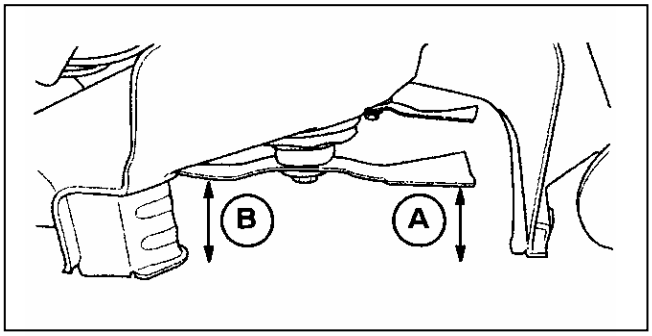
4. Stop the engine and remove the key from the key switch.

5. Rotate the mower blades to a position parallel with the tractor frame.

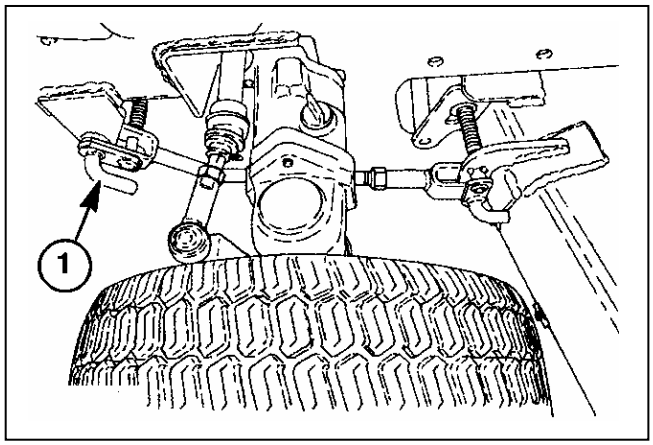


6. Measure one blade at the front and rear end.

7. The front Ⓐ of the blade should be 3 mm lower than the rear Ⓑ of the blade. If the difference is more than 3 mm, proceed to the next step to adjust.

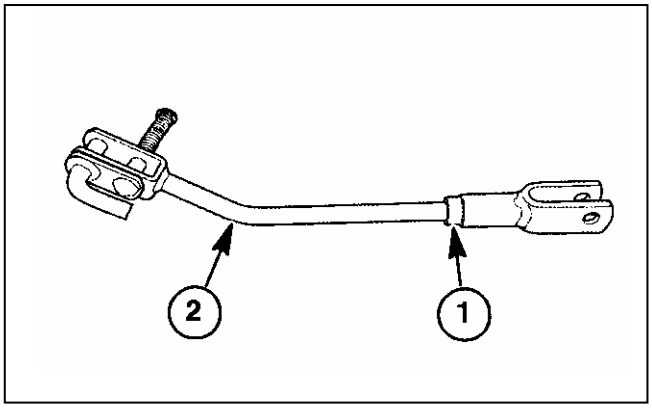


8. With the deck lowered in the 4" cutting height position, disconnect the front links ① from the tractor.



9. Loosen the lock nut ① on the left and right front links.

IMPORTANT: *Count the number of turns required on each front link to achieve proper adjustment Use the same number of turns on each front link to maintain side to side level.*



10. Turn the front portion ② of the link arm and adjust as follows:

    - Lengthen the adjuster (turn out) to lower the front of the blade, or;
    - Shorten the adjuster (turn in) to raise the front of the blade.

11. Connect the front links to the tractor and measure the front and rear blade height.

IMPORTANT: *Front of blade must never be higher than rear of blade.*

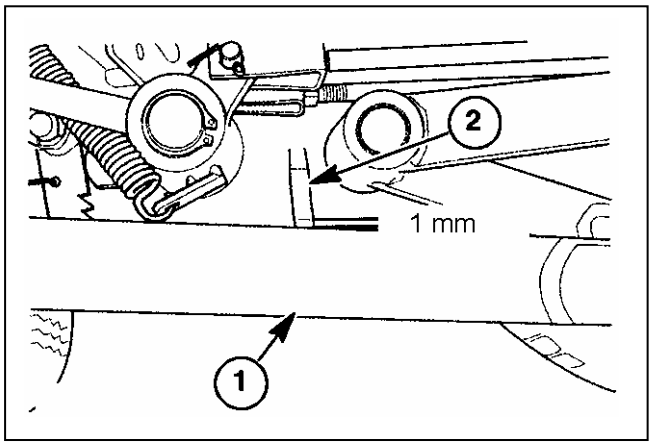
12. Repeat steps 8-11 until blades are within 3 mm. Tighten the lock nuts on the front links when adjustment is correct.

Adjusting Lift Height Stops

With the mower deck adjusted for side to side and front to rear level, the next step is to set the deck height in the full up position to allow the transport lock feature to operate. Use the following procedure for deck height stop adjustment.

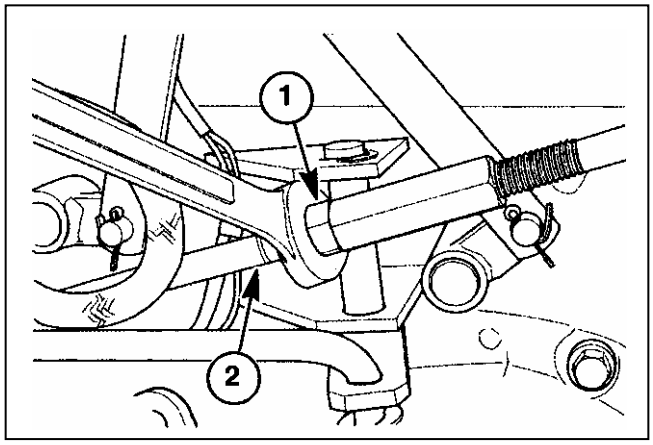
1. Start the tractor and raise the deck to the full up position, using the 3PT control lever. Stop the engine and remove the key from the key switch.

2. Measure the clearance between the frame stop ② and link arm ①. Clearance should be 1 mm.



3. If clearance between frame stop and lift link is more or less than 3 mm, loosen the jam nut ① on the lift arm rod ②.

NOTE: *Lift arm adjuster is located to the inside of the left rear tire, above the left rear axle housing.*

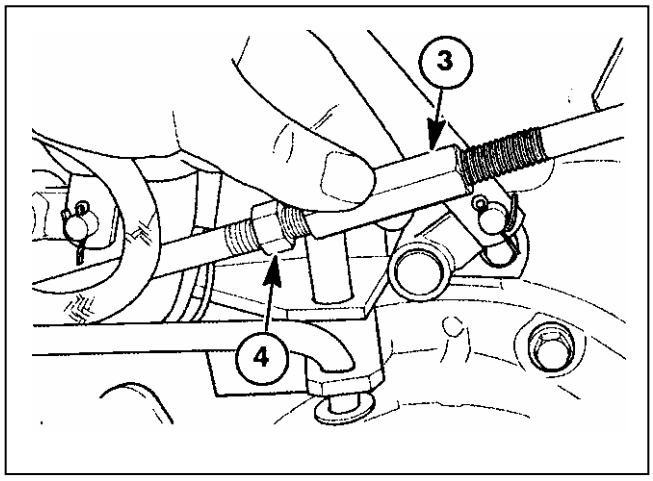


4. Turn the adjuster ③ to achieve the following:

   - Turn the -adjuster clockwise to shorten the rod, raising the deck if clearance is more than 3 mm.
   - Turn the adjuster counter-clockwise to lengthen the rod, lowering the deck if clearance is less than 3 mm.

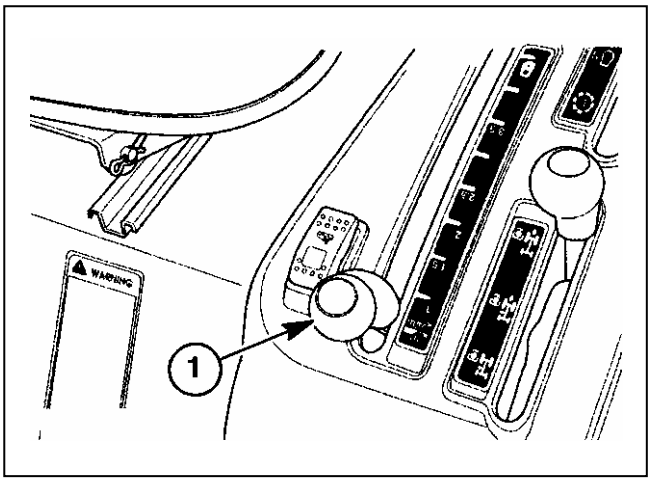
5. Start the tractor. Lower fully and then raise fully the mower deck. Measure the frame stop to lift link clearance. Repeat steps 1 - 5 until desired clearance is obtained.

6. Lock the jam nut ④ against the adjuster ③.



CUTTING HEIGHT ADJUSTMENT

Cutting height is controlled by the height adjustment control lever ①. The cutting height can be set to seven different heights; 1", 1.5", 2", 2.5", 3", 3.5" and 4".

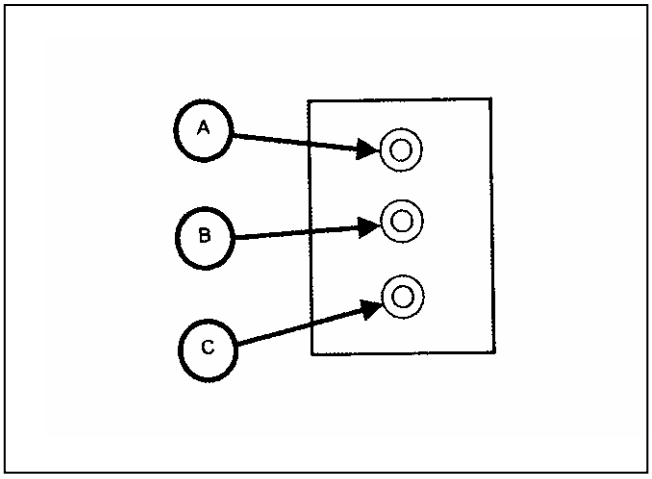


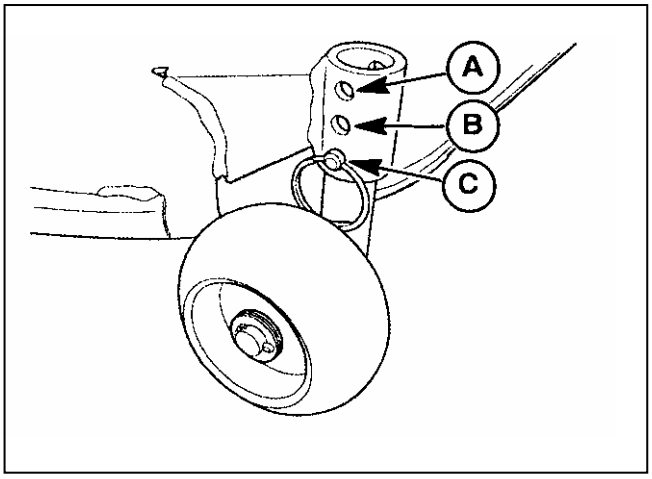
IMPORTANT: *Deck must be in the "full up" position before cutting height can be changed. Do Not attempt to change cutting height with deck in any other position than "full up".*

IMPORTANT: *When gauge wheels are properly adjusted, gauge wheels will not contact the ground! Gauge wheels are NOT meant to continuously contact the ground, the wheels act as anti scalp rollers on the four corners of the deck.*

Gauge wheels must be adjusted according to the cutting height setting. Use the following chart for gauge wheel position.

CUTTING HEIGHT POSITION (On control lever)	FRONT and REAR GAUGE WHEEL HEIGHT (ground to center of wheel)	HOLE POSITION
1.0"	66 mm	A
1.5"	78 mm	A
2.0"	91 mm	A
2.5"	104 mm	A
3.0"	97 mm	B
3.5"	89 mm 109 mm	C B
4.0"	102 mm	C





LUBRICATION

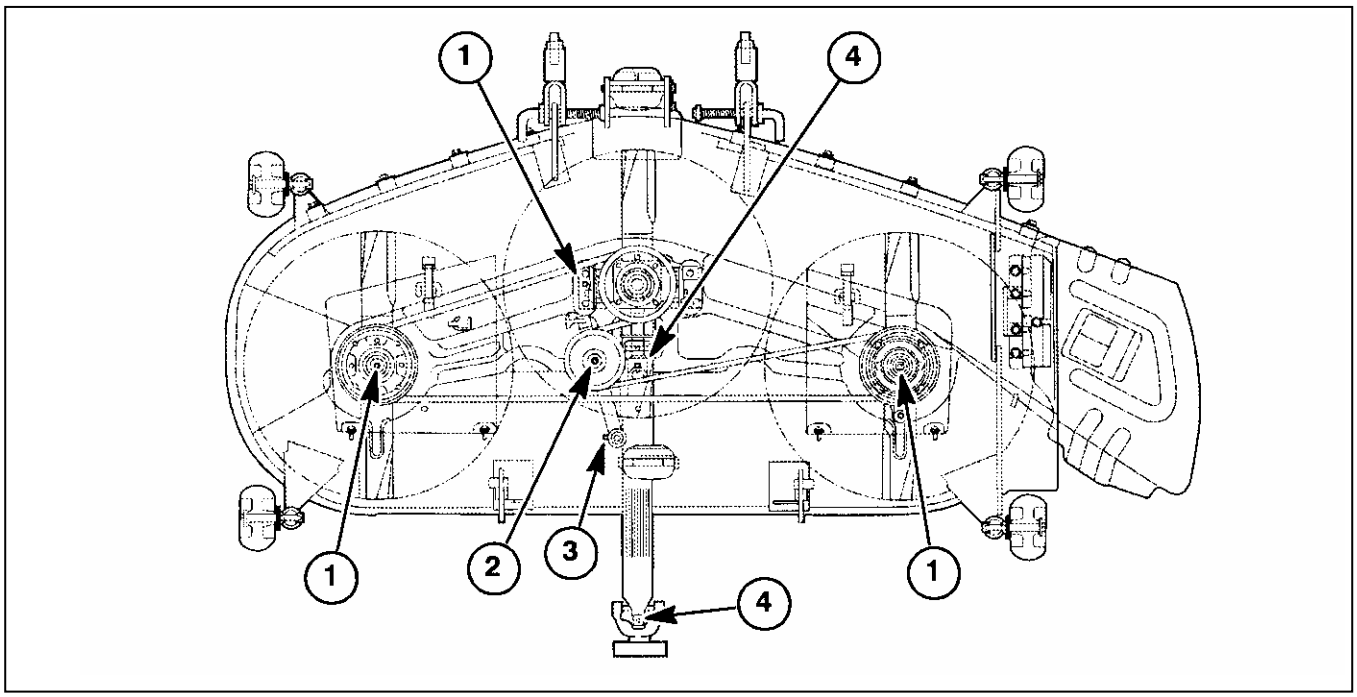
Before operating the SXM54 or SXM60 mower, make sure all indicated lubrication points have been properly lubricated according to the diagram.

Always wipe the fitting to be lubricated with a clean cloth before using a grease gun. Dirt injected through the grease fitting will damage closely machined parts.

Use SAE multi-purpose lithium base grease on all lubrication points. Do not allow excess grease buildup on or around parts, especially when the mower is used in sandy areas.

Lubricate all grease points every 25 hours.

REF. NO.	DESCRIPTION	25 HRS.
1	Blade Spindle (3)	•
2	Idler Pulley Shaft (1)	•
3	Idler Arm Shaft (1)	•
4	Driveline U-Joint (2)	•

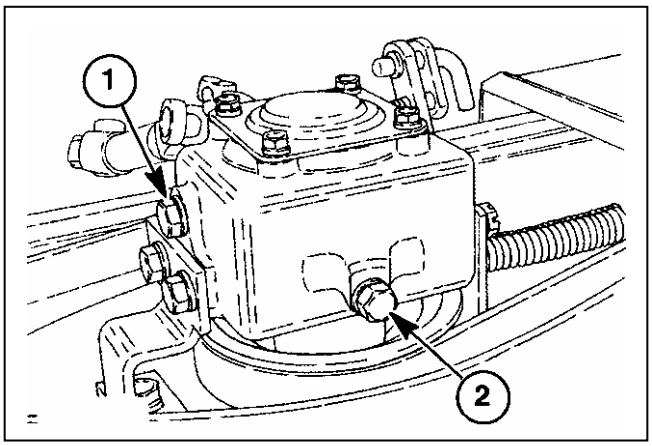


Gearbox

Check the oil in the gearbox weekly. To check oil level, remove the oil level check/fill plug ① from the gearbox. Oil should be at that level. If necessary to add oil, use only SAE 80-90W gear oil.

To fill gearbox with oil, remove the check/fill plug ① and add oil until excess exits the check hole.

Gearbox oil level should be checked daily. The oil must be changed at 50 hours of service. Change the gearbox oil every 150 hours after the initial oil change at 50 hours. Loosen and remove the drain plug ② to drain the oil from the gearbox.



REMOVAL AND STORAGE

For Removal and Installation procedure of the SXM54 and SXM60 mower decks, see "Mounting" and "Dismounting" sections in this chapter.

SEASONAL STORAGE

Proper off-season storage is critical for operation and performance of the mower deck when reinstalled on the tractor in preparation for the mowing season. Follow the steps listed for storage over the off season.

1. Remove the deck from the tractor.

2. Clean the entire mower deck of dried grass clippings, especially the underside of the deck.

3. Remove, sharpen or replace the mower blades.

4. Inspect, or replace the deck belt. (Relieve the belt tension by removing the belt from the idler pulley during storage)

5. Inspect the entire mower deck for damaged or worn parts. Make replacements as necessary using genuine SHIBAURA service parts.

6. Service the mower deck as described in the "LUBRICATION" section, and re-torque all fasteners according to the information found in the "TORQUE SPECIFICATIONS".

7. Clean all pulleys with a dry cloth and apply a very light film of oil on the pulleys.

NOTE: *Leave the drive belt slack. Clean pulleys and re-install the drive belt just prior to placing mower into service.*

8. Touch-up the paint where necessary to prevent rust or corrosion.

9. Replace all damaged or illegible decals.

10. Store the mower in a clean and dry location. If the mower deck is to be stored outdoors, cover it with a leak proof tarp.

MAINTENANCE

MOWER BLADE REMOVAL AND INSTALLATION

Blade Removal

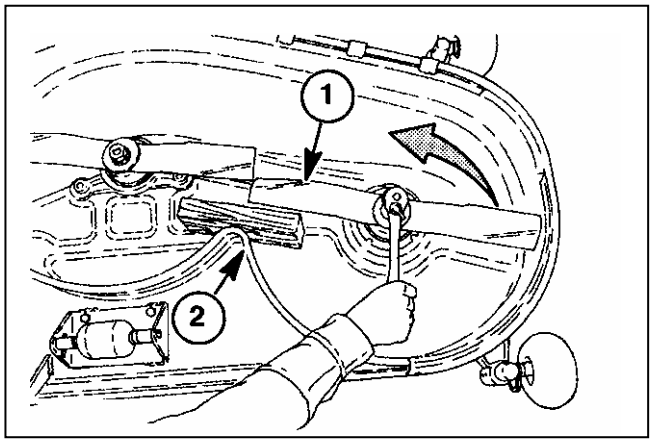
⚠ WARNING ⚠

Do not work under the raised tractor or mower deck unless it is securely supported by a hoist or floor jack and jackstands.

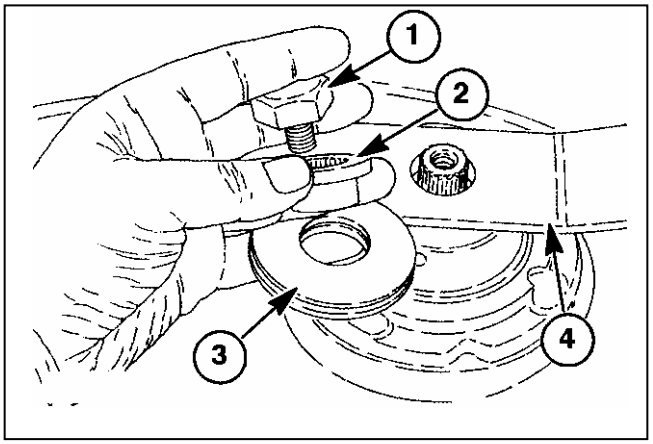
⚠ WARNING ⚠

To avoid injury when handling blades, wear leather gloves or wrap the blades in the area where they will be held with heavy cloth or other protective material.

1. Remove the mower deck from the tractor. (See "Mower Deck Removal")
2. Turn the deck over to expose the blades.
3. Wedge a block of wood between the blade ① and mower housing ② to prevent the spindle from rotating.
4. Use a 1 -3/16" socket or long handle box wrench to loosen the blade retaining bolt.



5. Remove the bolt ① spacer ② two cup washers ③ and blade ④.
6. Repeat steps 1 - 5 for the remaining two blades.



IMPORTANT: *Note and mark the mounting position of each blade during removal. For prolonged blade life it is recommended to rotate the blades to different spindles during installation.*

Inspection

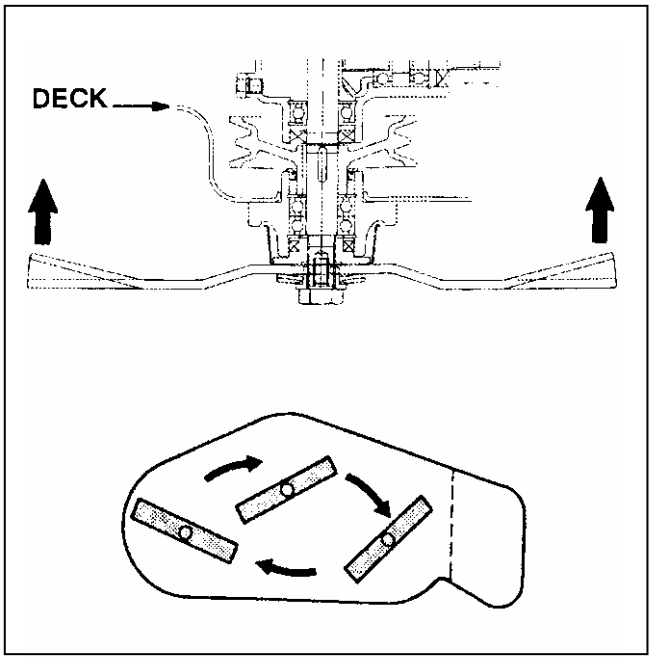
1. Inspect the blades for chipping, cracking or bent. Any damage that is not repairable through sharpening only, warrants blade replacement.
2. Inspect the cup washers. If washers are flattened, worn or damaged, replace with new washers.

IMPORTANT: *Damaged or Worn cup washers will allow the blade to slip excessively causing wear and damage to other deck components. Do not use worn or damaged cup washers.*

Blade Installation

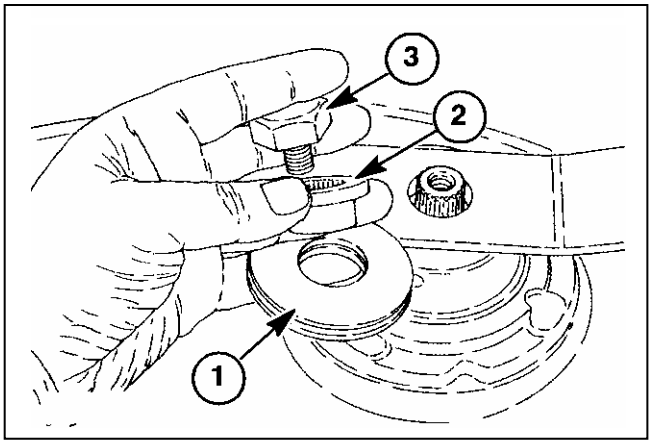
1. Place the new or sharpened and balanced blades on the spindles with the curved edge (sail) part of the blade facing "up" towards the underside of the deck.

NOTE: *Rotate the blades to different spindles (from the removed position) according to the inset drawing.*



2. Install the two cup washers ① spacer ② and bolt ③.

3. Hand tighten the bolt.

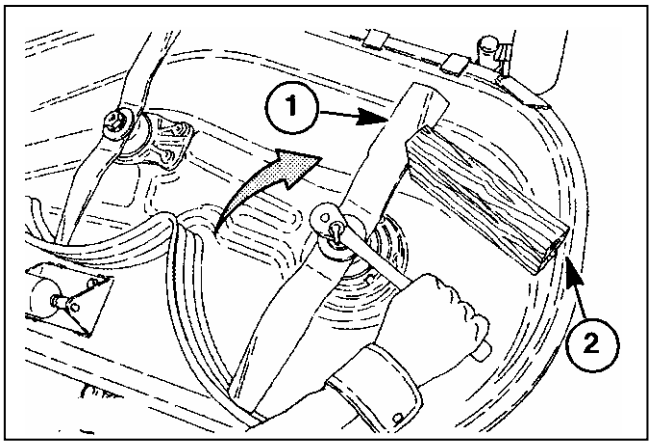


4. Wedge a block of wood between the blade ① and mower housing ② to prevent the spindle from rotating.

5. Use a M20 socket or long handle box wrench to tighten the blade retaining bolt. Torque each blade bolt to 98 - 118 N·m.

IMPORTANT: *Recheck and re-torque the blade and spindle pulley fasteners after the first hour of mower operation, and daily thereafter.*

NOTE: *High lift blade kits are available, for difficult cutting/discharge conditions*



MOWER BLADE SHARPENING

Inspect the mower blades before each use to be sure they are properly installed and are in good condition. Replace any blade that is bent, cracked, excessively nicked or worn. Use only genuine SHIBAURA blades on this mower.

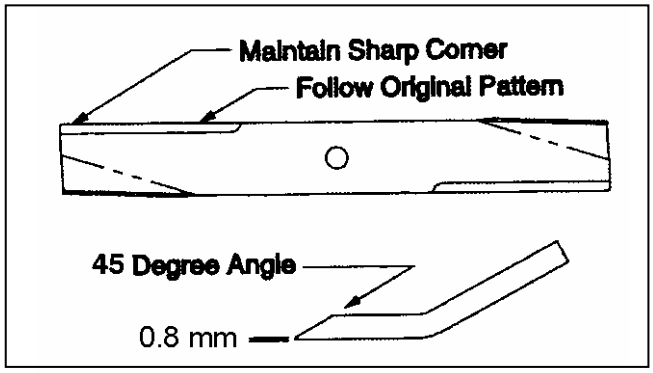
⚠ WARNING ⚠

To avoid injury when handling blades, wear leather gloves or wrap the blades in the area where they will be held with heavy cloth or other protective material. Always wear eye protection when sharpening blades.

IMPORTANT: *When sharpening blades, remove the same amount of material from each blade to maintain balance. Unbalanced blades will cause excessive vibration, which could damage gearbox and mower components.*

1. Use a mill file or grinder to sharpen the blades following the original 45° angle pattern. If using a grinder, use care so the cutting edge does not get too hot from friction, causing it to lose its heat treat.

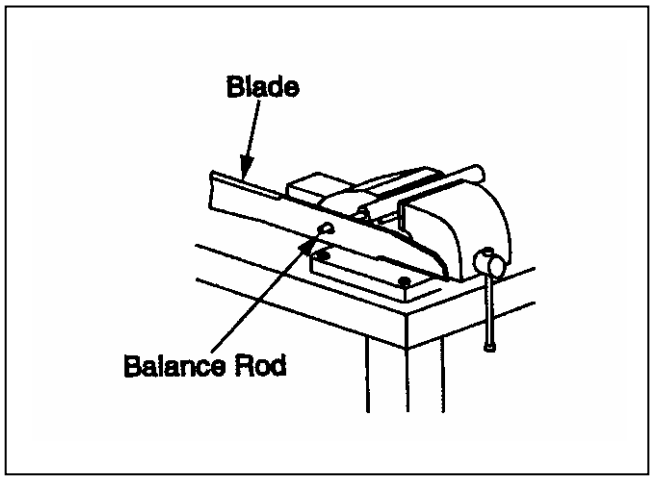
IMPORTANT: *DO NOT sharpen cutting edge to a razor edge. Leave a 0.8 mm edge as shown.*



2. Check the blade for balance by placing a horizontal rod with an O.D. less than 16 mm, in a vise.

3. Place the blade on the rod. The heavy side of the blade should drop down.

4. Sharpen on the heavy side of the blade until the blade remains balanced on the rod.



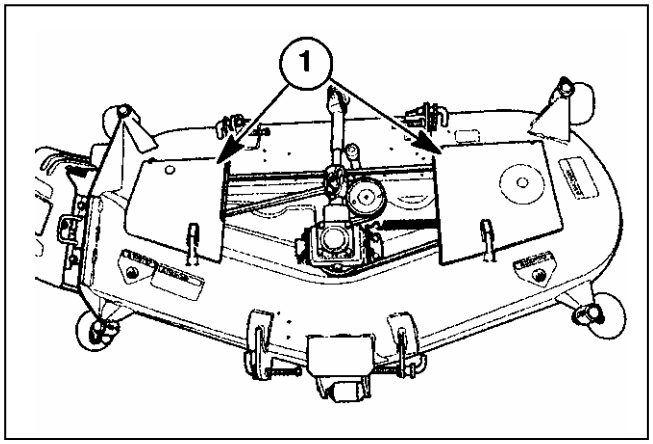
BELT REPLACEMENT

Removal

1. Remove the mower deck from the tractor. (See "Dismounting The Mower Deck")

2. Remove the left and right belt cover shields ① from the deck.

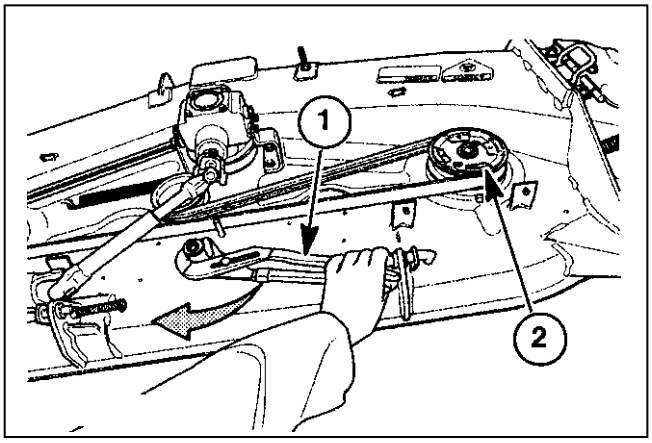
3. Clean the area around the gearbox and pulleys.



IMPORTANT: *Use a helper to remove belt. Idler pulley is under tension and may cause a pinch point if attempting to release tension and remove belt at the same time.*

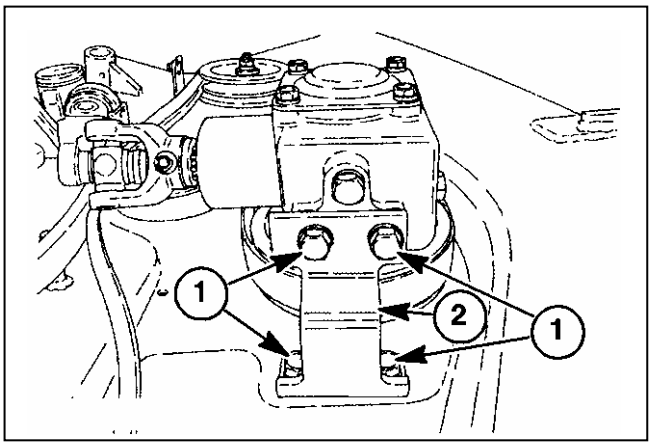
4. Use a large, slip joint pliers ① to rotate the idler pulley arm, releasing tension on the belt.

5. Roll the belt off the end pulley ②. Release the idler pulley arm.



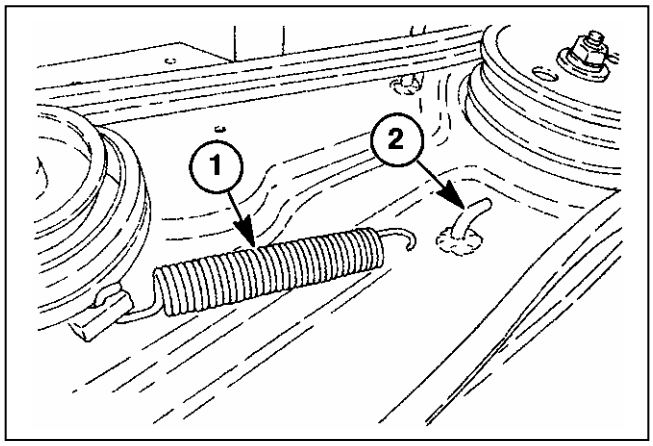
6. Remove the four bolts ① from the gearbox bracket ②. Remove the bracket.

7. Remove the belt from the deck.

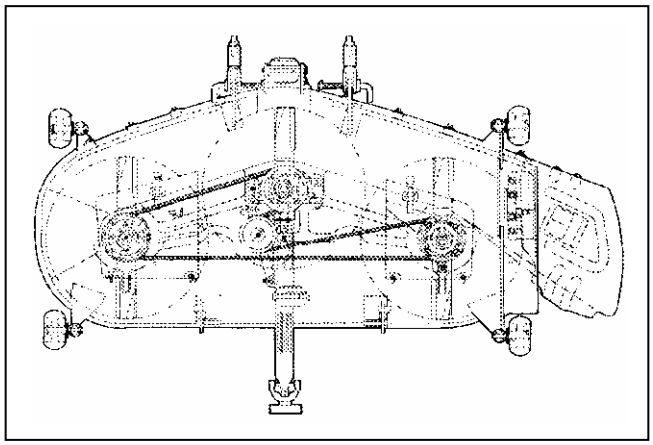


Installation

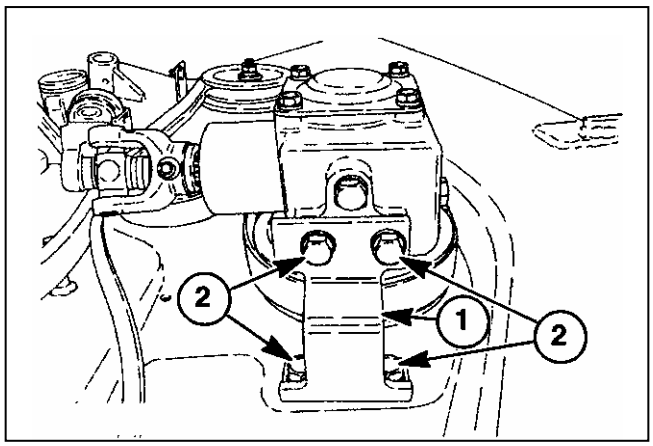
1. Remove the tension spring ① from the spring hook ② on the deck.



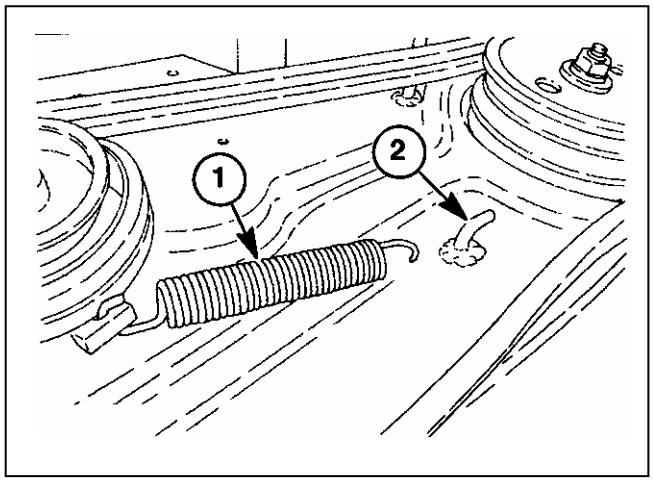
2. Route the new belt around the pulleys as shown.



3. Install the gearbox bracket ① and secure with the bolts ②. Tighten the bolts to 77 - 90 N·m.

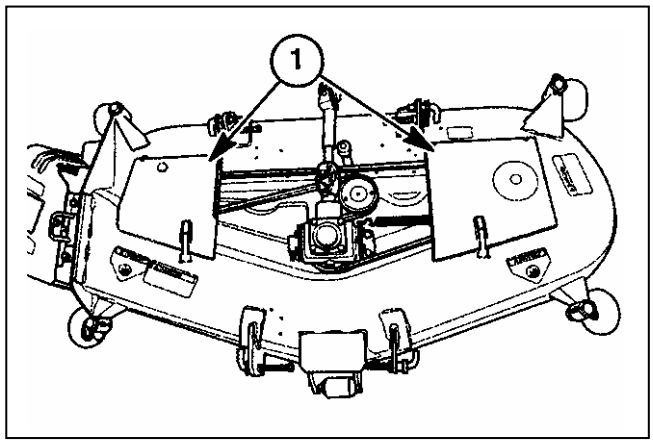


4. Connect the spring ① to the spring hook ②.



5. Install the left and right belt cover shields ① onto the deck.

6. Install the deck on the tractor. (See "Mounting The Mower Deck")



TROUBLESHOOTING

The following troubleshooting guide is for the mower and its drive. This assumes the tractor engine is running to prescribed specifications and the tractor hydraulics are working properly. Consult the applicable Tractor Repair Manual for all tractor system checks.

Before attempting any repair or test, observe the general condition of the tractor and mower. Make certain the tractor is operating properly and the mower is setup correctly. The following charts may give you some hints in solving a problem with the mower. If the problem cannot be easily solved, contact your SHIBAURA Dealer.

SYMPTOM	PROBLEM	CORRECTION
Excessive Vibration	Loose gearbox bolts.	Re-torque or replace as necessary.
	Loose spindle/blade fasteners.	Re-torque or replace as necessary.
	Damaged gearbox.	Rebuild gearbox as necessary.
	Worn or damaged driveline U-joints.	Rebuild driveline as necessary.
	Blade interference with grass buildup.	Clean the underside of the deck.
	Blades unbalanced.	Balance blades.
	Blade broken.	Replace mowing blades in sets.
Gearbox Overheating	Low on lubricant.	Fill to oil level plug.
	Debris buildup on top of deck around gearbox.	Clean deck top and remove debris.
Gearbox Noisy	Worn or rough bearings.	Replace bearings.
	Worn or rough gears.	Run-in gears, or rebuild gearbox.
Gearbox Leaking	Damaged oil seal.	Replace oil seal.
	Damaged shaft in seal area.	Replace shaft and oil seal.
	Oil seal installed wrong, or upside down.	Replace oil seal.
	Oil level too high in housing.	Drain oil to correct level.
	Cracked or broken housings.	Replace housings or gearbox assembly.
	Gasket damaged.	Replace liquid gasket.
	Bolts loose.	Re-torque bolts.
Blades Wear Too Fast	Cutting in sandy conditions.	Increase deck cutting height.
	Cutting in rocky conditions.	Increase deck cutting height.
	Heat treat removed by sharpening with grinder.	Replace blades in sets.
Not Cutting Clean	Blades dull.	Sharpen or replace blades.
	Blades installed upside down.	Install blades correctly.
	Blade RPM too low.	Use full throttle position.
	Mower not level.	See cutting height adjustments, Tires under inflated.
	Tractor tires mashing grass.	Too wet or lush to cut. Reverse direction of cut and re-mow the area.
	Ground speed too fast.	Reduce ground speed.
	Excessive grass buildup under mower deck.	Clean underside of deck.

SYMPTOM	PROBLEM	CORRECTION
Streaking or Wind row Conditions in Swath	Blades dull.	Sharpen or replace blades.
	Blades upside down.	Install blades correctly.
	Conditions too wet for mowing.	Allow grass to dry before cutting.
	Deck lower at rear than front.	See cutting height adjustments.
	Excessive grass buildup under mower deck.	Clean underside of deck.
Mower Loads Tractor	Engine RPM too low.	Use full throttle position.
	Ground speed too fast.	Reduce ground speed.
	Excessive grass buildup under mower deck.	Clean underside of deck.
	Gearbox wear or damage.	Rebuild gearbox as necessary.
	Driveline damage.	Repair driveline as necessary.
Excessive Noise	Grass and debris buildup under the deck will cause excessive noise, as the mower blades will contact this buildup. Clean the underside of the mower deck regularly, especially if the mowing conditions were wet or very lush.	

SPECIFICATIONS

SXM54 and SXM60 Side Discharge Mower Decks

SPECIFICATIONS	SXM54	SXM60
Tractor Required	SX21, SX24	SX21, SX24
Cutting Width (Actual)	1372 mm	1524 mm
Overall Width	1720 mm	1870 mm
Cutting Height (7 positions)	1", 1.5", 2", 2.5", 3", 3.5", 4"	1", 1.5", 2", 2.5", 3", 3.5", 4"
Spindle Speed @ Engine Rated Speed (3000 rpm)	3060 rpm	2870 rpm
Blade Tip Speed	76.1 m/s	78.5 m/s
Number Of Blades	3	3
Blade Length	475 mm	523 mm
Blade Width	60 mm	60 mm
Blade Thickness	7 mm	7 mm
Shipping Weight	100 kg	120 kg

SECTION 5
SPECIFICATIONS

	Model SX21 Hydrostatic	Model SX24 Hydrostatic
ENGINE		
Type	S753 Diesel	S773 Diesel
Engine Gross Horsepower	15.7 kw (21hp)	17.9 kw (24 hp)
Cylinders	3	3
Bore 75 mm (2.95")	75 mm	77 mm
Stroke	72 mm	72 mm
Displacement	0.954 L	1.005 L
Compression Ratio	24.0 : 1	24.0 : 1
Firing Order	1 – 2 – 3	1 – 2 – 3
Low Idle Speed	1300 ± 50 RPM	1300 ± 50 RPM
Maximum Speed		
High Idle	3200 ± 50 RPM	3200 ± 50 RPM
Rated	3000 ± 50 RPM	3000 ± 50 RPM
Valve Clearance (Cold):		
Intake	0.20 mm	0.20 mm
Exhaust	0.20 mm	0.20 mm
CAPACITIES		
Fuel Tank	29.5 liters	29.5 liters
Cooling System	3.5 liters	3.5 liters
Engine Crankcase		
With Filter	3.3 liters	3.3 liters
Rear Axle & Transmission	13 liters	13 liters
Power Steering	Using Transmission Oil (Common Use)	Using Transmission Oil (Common Use)
Front Axle Differential/Final Reduction Gear Case	2.0 liters	2.0 liters

	Model SX21 Hydrostatic	**Model SX24 Hydrostatic**
COOLING SYSTEM		
Type	Pressurized Liquid with Recirculating Bypass	Pressurized Liquid with Recirculating Bypass
Water Pump:		
Type	Centrifugal	Centrifugal
Drive	V – Belt	V – Belt
Belt		
Deflection	5 – 10 mm when 5 kg thumb pressure is applied midway between pulleys	5 – 10 mm when 5 kg thumb pressure is applied midway between pulleys
Fan Diameter	330 mm	330 mm
Number of Fan Blades	7	7
Thermostat:		
Start to Open	82ºC	82ºC
Fully Open	95ºC	95ºC
Radiator Cap	90 kPa	90 kPa
ELECTRICAL SYSTEM		
Main system Protection	40A Slow – Blow fuse	40A Slow – Blow Fuse
Number of fuses for Circuit Protection	3	3
Alternator	12V/40A	12V/40A
Battery Type	12V, 36 amp. 46B24R	12V, 36 amp 46B24R
Start HP (kw) Rating	1.6 (1.2)	1.6 (1.2)
Starting Motor	Pre-Engaged Reduction	Pre-Engaged Reduction
FUEL SYSTEM		
Fuel Type		
Type of Fuel to Use if Above 4.5ºC	No.2-Diesel, Cetane Rating: Minimum 40	No. 2-Diesel, Cetane Rating: Minimum 40
Type of Fuel to Use if Below 4.5ºC	No.1-Diesel, Cetane Rating: Minimum 40	No. 1-Diesel, Cetane Rating: Minimum 40
Injection Pump		
Type	In-Line	In-Line
Timing	23ºBTDC	23ºBTDC

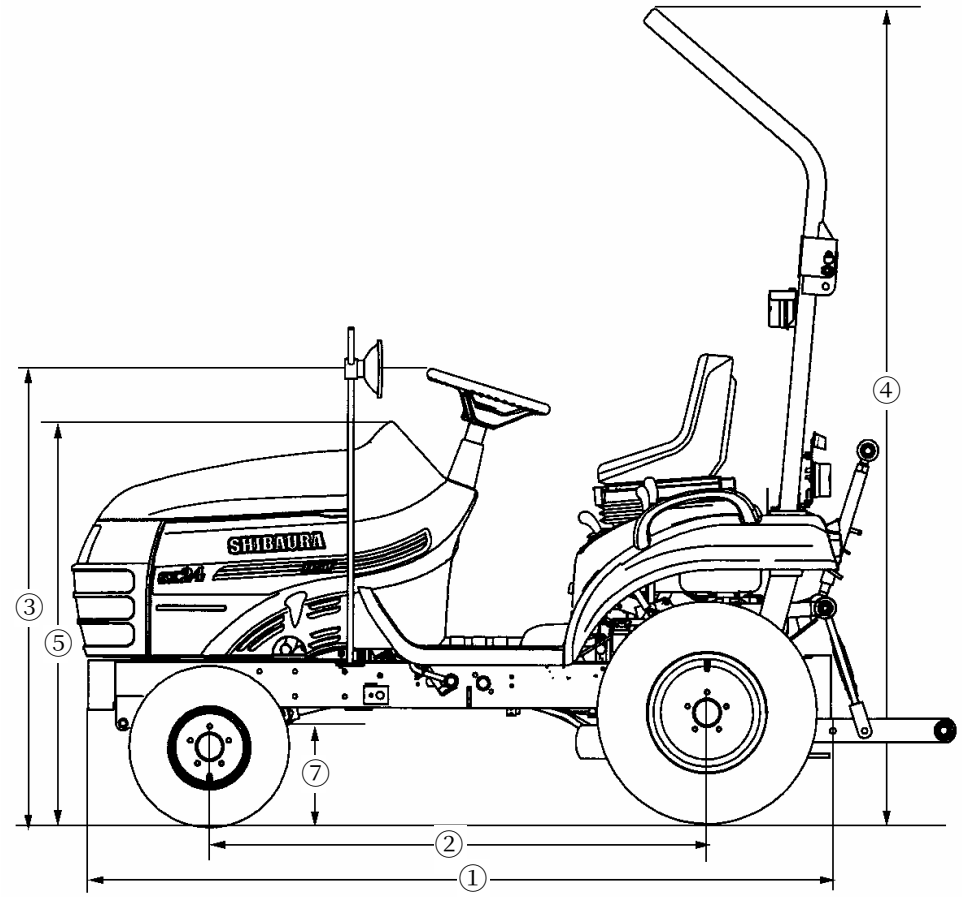
	Model SX21 Hydrostatic	**Model SX24 Hydrostatic**
BRAKES		
Type	Wet Disc	Wet Disc
2 Discs per Side	134 mm × 94 mm Diameter	134 mm × 94 mm Diameter
STEERING		
Type	Power	Power
Pump Flow @ Rated RPM	7 liters/min	7 liters/min
Steering Relief Valve Setting	8 MPa	8 MPa
Turns, Lock-to-Lock:		
FWD	2	2
Front Wheel Toe-In	0 – 5 mm	0 – 5 mm
Turning Radius:		
FWD	2280 mm	2280 mm
Max Turn Angle: FWD	49º	49º
Front to Rear Axle Ratio	1.4974	1.4974
POWER TAKE-OFF (PTO)		
Type	Live	Live
Shaft:		
Rear PTO	35 mm	35 mm
Mid PTO	25.4 mm	25.4 mm
Engine Speed 540 RPM		
Rear PTO Operation	2992 RPM	2992 RPM
Engine Speed for 2200 RPM		
Mid PTO Operation	3020 RPM	3020 RPM
Horsepower PTO Observed	11.9 kw (16 hp)	13.6 kw (18.3 hp)
HYDRAULIC LIFT SECTION		
Type	Open Center	Open Center
Pump Type	Gear	Gear
Pump Capacity	14.2 L/min	14.2 L/min
System Relief Valve Setting	13 MPa	13 MPa
Number of Remotes Available	1	1

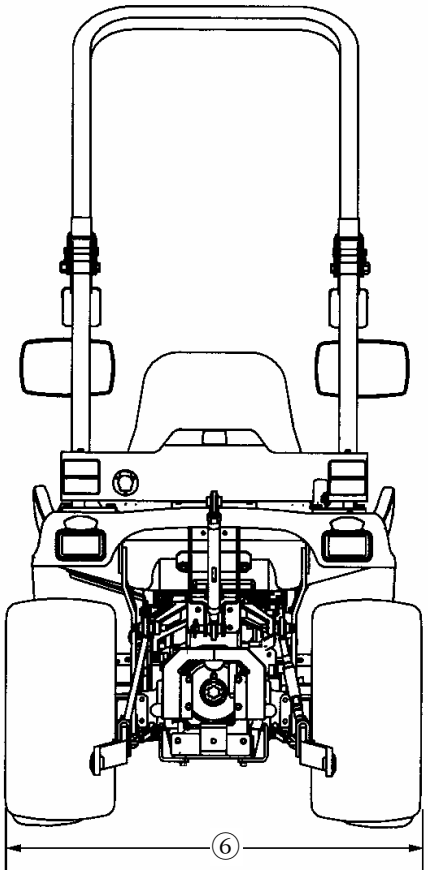
	Model SX21 Hydrostatic	Model SX24 Hydrostatic
TRANSMISSION SPEEDS		
(From 3000 RPM Engine Speed with Turf 26 × 12.00 – 12 Rear Tires)		
(Forward):		
Low	0 – 8.1 KPH	0 – 8.1 KPH
High	0 – 16.3 KPH	0 – 16.3 KPH
(Reverse):		
Low	0 – 5.4 KPH	0 – 5.4 KPH
High	0 – 10.9 KPH	0 – 10.9 KPH
TRANSMISSION SPEEDS		
(From 3000 RPM Engine Speed with BAR 26 × 12.00 – 12 Rear Tires)		
(Forward)		
Low	0 – 8.3 KPH	0 – 8.3 KPH
High	0 – 16.6 KPH	0 – 16.6 KPH
(Reverse)		
Low	0 – 5.5 KPH	0 – 5.5 KPH
High	0 – 11.2 KPH	0 – 11.2 KPH
TRANSMISSION SPEEDS		
(From 3000 RPM Engine Speed with AG 7-14 Rear Tires)		
(Forward)		
Low	0 – 8.1 KPH	0 – 8.1 KPH
High	0 – 16.3 KPH	0 – 16.3 KPH
(Reverse)		
Low	0 – 5.4 KPH	0 – 5.4 KPH
High	0 – 10.9 KPH	0 – 10.9 KPH

	Model SX21 Hydrostatic	Model SX24 Hydrostatic
CAST IRON WEIGHTS		
Front End:		
BAR & Turf & AG Tires-With FWD	(2) weights @ 60 kg each	(2) weights @ 60 kg each
Rear Wheel (per wheel)		
BAR Tires	N/A	N/A
Turf Tires	N/A	N/A
AG tires	N/A	N/A
DRAWBARS		
Fixed/Clevis	Standard	Standard
3-POINT HITCH		
Category Type	1	1
Position Control Type	Mechanical	Mechanical
Draft Control Type	N/A	N/A
Drop Rate Control	Standard	Standard
Lift Capacity @ 24"		
Behind kg (lbs.)	318 kg	318 kg
TIRES		
FRONT:		
BAR:	18 × 8.50-8	18 × 8.50-8
Turf:	18 × 8.50-8	18 × 8.50-8
AG:	4.00 – 9	4.00 – 9
REAR:		
BAR:	26 × 12.00-12	26 × 12.00-12
Turf:	26 × 12.00-12	26 × 12.00-12
AG:	7 – 14	7 – 14
WHEEL BOLT TORQUES		
Front Wheel-Disc-to-Hub:		
FWD	88 N·m	88 N·m
Rear Wheel-		
Disc-to-Axle	122 N·m	122 N·m
Disc-to-Rim	N/A	N/A
ROPS ATTACHING BOLT TORQUES		
ROPS to Rear Axle	50 N·m	50 N·m

GENERAL DIMENSIONS

	Model SX21 Hydrostatic	Model SX24 Hydrostatic
(1) – LENGTH, Overall:		
STD 4WD (Less 3-pt hitch and tires, to end of drawbar)	2085 mm	2085 mm
STD 4WD (With 3-pt hitch in Horizontal position)	2445 mm	2445 mm
(2) – WHEEL BASE:		
FWD	1400 mm	1400 mm
HEIGHTS		
(3)-Top of Steering Wheel:		
Turf Tires	1275 mm	1275 mm
BAR Tires	1280 mm	1280 mm
Ag. Tires	1275 mm	1275 mm
(4) – Top of ROPS – Fixed		
w/Turf Tires	2280 mm	2280 mm
BAR w/ Tires	2290 mm	2290 mm
Ag. Tires	2285 mm	2285 mm
(5) – Hood Height (Top of Instrument cluster)		
w/Turf Tires	1130 mm	1130 mm
BAR w/Tires	1130 mm	1130 mm
Ag. Tires	1130 mm	1130 mm
(6) – WIDTH (Rear Axle – Outside to Outside)		
w/Turf Tires	1180 mm	1180 mm
BAR w/Tires	1175 mm	1175 mm
Ag. Tires	1085 mm	1085 mm
(7) – MINIMUM GROUND CLEARANCE (Under Rear Hitch)		
w/Turf Tires	185 mm	185 mm
BAR w/Tires	190 mm	190 mm
Ag. Tires	190 mm	190 mm
WHEEL TREAD SETTINGS		
FRONT:		
Turf 18 × 8.50-8	940 mm	940 mm
BAR 18 × 8.50-8	940 mm	940 mm
Ag 4.00 – 9	910 mm	910 mm
REAR:		
Turf 26 × 12.00-12	870 mm	870 mm
BAR 26 × 12.00-12	870 mm	870 mm
Ag 7 – 14	910 mm	910 mm
WEIGHT (Bare Tractor):		
With ROPS – FWD	670 kg	675 kg


SHIBAURA
④
③
⑤
⑦
②
①


⑥

INDEX

Air Cleaner ····· 3-10
Alternator ····· 3-22
Battery ····· 3-21
Belt Replacement ····· 4-28
Brake Adjustment ····· 3-29
Brake Controls ····· 2-11
Break-in Procedures ····· 2-8
Care of Safety Decals ····· 4-5
Cast Iron Weights (Optional) ····· 2-24
Contents ····· 0-2
Cooling System ····· 3-16
Cutting Height Adjustment ····· 4-22
Decal Locations ····· 4-5
Diesel Fuel ····· 3-3
Dismounting the Mower Deck from the Tractor ····· 4-13
Drink Holder ····· 2-18
Driving the Tractor ····· 2-21
Drop Rate Valve ····· 2-20
Ecology and the Environment ····· 0-14
Electro-magnetic interference (EMC) ····· 0-3
Engine ····· 3-6
Fixed/Clevis Drawbar ····· 2-16
Front Axle Differential/Final Reduction Gear Case ····· 3-30
Front Axle Pivot/Standard Fwd Axle ····· 3-31
Front-Wheel Drive ····· 2-12,3-30,
Fuel Shutoff Valve ····· 2-11
Fuel and Lubricant Service Procedures ····· 3-6
Fuse Block ····· 3-22
General Dimensions ····· 5-6
General Information ····· 1-1, 3-1, 4-7
General Maintenance ····· 3-16
Grass Discharge ····· 4-8
H.S.T. Foot Pedal ····· 2-13
H.S.T. Range Lever ····· 2-13
Headlamp ····· 3-23
Hood Latch ····· 2-17
Hydraulic Power Lift (H.P.L.)(3 PT) ····· 2-19
Hydraulics System Oil Filter ····· 3-15
Hydrostatic Transmission (H.S.T.) Model ····· 2-13
Hydrostatic Transmission (H.S.T.) System Oil Filter ····· 3-15
Identification Numbers ····· 4-1
Improvements ····· 0-1
Index ····· 5-8
Instruction Decals ····· 0-10
Instrument Lights ····· 3-24
Instrument Panel ····· 2-3
Introduction ····· 4-1
Key Switch ····· 2-5
Lighting ····· 2-9
Liquid Ballast (Optional) ····· 2-25
Lubricants ····· 3-5
Lubrication ····· 4-23
Lubrication Fittings ····· 3-3
Lubrication and Maintenance ····· 3-1
Lubrication and Maintenance Chart ····· 3-2
Main Fuse ····· 3-23
Maintenance and Inspection of the Rollover Protective Structure (POPS) ····· 3-20
Metric Bolt Torque Specification ····· 1-2, 4-2
Mounting the Mower Deck to the Tractor ····· 4-10
Mower Blade Removal and Installation ····· 4-25
Mower Blade Sharpening ····· 4-27
Mower Deck Leveling ····· 4-17
Mower Operation ····· 4-3
Mower Transport Lock ····· 4-16
Notes ····· 5-19
Operating Instructions ····· 4-7
Operating the Tractor & Mower ····· 4-4
Operation ····· 2-1
Operation of the Power Take-off (PTO) ····· 2-15
PTO Lever Control ····· 2-14
PTO Shield and Cap ····· 2-14
Parking Brake Adjustment ····· 3-29
Parking Brake Control ····· 2-12
Possible Damage to the ROPS ····· 3-20
Pre-heating the System ····· 2-5
Precautionary Statements ····· 0-4
Predelivery Service ····· 5-11
Primary Fuel Filter ····· 3-7
Rear PTO Operation (Without Operator in Seat) ····· 2-15
Rear Remote Control Valve (Optional) ····· 2-20
Removal and Storage ····· 4-24
Rollover Protective Structure (ROPS) ····· 2-2
SXM54, SXM60 Mower Deck ····· 4-1
Safety ····· 0-5
Safety Decals ····· 4-5, 4-7
Seasonal Storage ····· 4-24
Seat, Seat Belt, and Rollover Protective Structure (ROPS) ····· 2-1
Secondary Fuel Filter ····· 3-8
Servicing the Mower ····· 4-4
Specification ····· 5-1

Specifications 4-33
Starting the Engine 2-6
Starting the Tractor with Jumper Cables 2-8
Stopping the Engine 2-8
Taillight/Flasher Warning Light/Side Light 3-24
The Mower 4-3
The Tractor 4-3
Three-point Linkage 2-17
Throttle Controls 2-11
Tips for Efficient Mowing 4-7
Tire Pressure 2-25
Tires 3-26
To the Owner & Operator 4-1
To the owner 0-1
Tool Box 2-18
Towing the Tractor 2-16
Tractor Hydraulics 2-19
Tractor Preparation 4-9
Tractor Storage 3-32
Tractor Weighting 2-23
Transmission, Rear Axle, and Hydraulic System 3-13
Troubleshooting 4-31
Uneven Terrain 4-8
Universal Symbols 0-15
Weighting Limitations 2-23
Weighting for Stability 2-23
Wheel Bolt Torque 3-27
Wheel Tread Settings 2-22

OWNER COPY

PRE-DELIVERY SERVICE

CHECK AND ADJUST AS REQUIRED
Tractor SX21/SX24

INOPERATIVE SERVICE CHECKS

1. _____ Tire Pressure – 2-25
2. _____ Air Cleaner Element & Hose Connections – 3-10, 3-11
3. _____ Radiator Coolant Level – 3-16
4. _____ Fan Belt Tension – 3-18
5. _____ Battery Cleanliness, Vent Openings, Electrolyte Level, & Charge – 3-21
6. _____ Engine Oil Level – 3-6
7. _____ Transmission & Rear Axle Oil Level - 3-13
8. _____ Front Axle & Final Reduction Gear Case Oil Level (FWD) – 3-30
9. _____ Upper Link & Hitch – 2-17, 2-18
10. ____ Brake Adjustment & Pedal Equalization – 3-29
11. ____ Rear Wheel Bolt Torque – 122 N·m - 3-27
12. ____ Front Wheel Bolt Torque – 88 N·m - 3-27
13. ____ Front Wheel Toe-in – 3-28
14. ____ Fuel Level – 3-4

SAFETY ITEMS CHECKS

1. _____ ROPS Installed – 2-2
2. _____ Seat Belts Installed – 2-1
3. _____ ROPS Bolt Torque – 50 N·m.
4. _____ PTO Shield Installed – 2-14
5. _____ Safety Decals Installed – 0-9 ~ 0-13
6. _____ Neutral Start Switches Operation – 2-5, 2-6
7. _____ Parking Brake & Operation – 2-12
8. _____ Flashing Lights/Tail Lights Operation – 2-9
9. _____ Operator's Manual #300813020
10. ____ Horn Operation – 2-10

OPERATIVE SERVICE CHECKS

All operating checks are to be performed with tractor at normal operating temperature.

1. _____ Lights & Instruments for Proper Operation, & Fuel Shut Down with Key Switch OFF – 2-3 ~ 2-8
2. _____ Fluid & Oil Leaks
3. _____ Maximum No-load Speed & Idle Speed Adjustments – 5-1
4. _____ PTO Engagement & Disengagement PTO Lever – 2-14
5. Hydraulic System:
   _____ Selector Lever for Position Control – 2-19
   _____ Drop Rate Operation – 2-20
6. _____ FWD-Drive Lever Operation – 2-12
7. _____ Operation of H.S.T. – 2-13

TRACTOR MODEL NO. _____ **INSPECTION PERFORMED** _____

TRACTOR MODEL NO. _____ **WARRANTY EXPLAINED** _____

Owner's Signature _____ **Date** _____

Owner's Signature _____ **Date** _____

DEALER COPY

PRE-DELIVERY SERVICE

CHECK AND ADJUST AS REQUIRED

Tractor SX21/SX24

INOPERATIVE SERVICE CHECKS

1. _____ Tire Pressure – 2-25
2. _____ Air Cleaner Element & Hose Connections – 3-10, 3-11
3. _____ Radiator Coolant Level – 3-16
4. _____ Fan Belt Tension – 3-18
5. _____ Battery Cleanliness, Vent Openings, Electrolyte Level, & Charge – 3-21
6. _____ Engine Oil Level – 3-6
7. _____ Transmission & Rear Axle Oil Level – 3-13
8. _____ Front Axle & Final Reduction Gear Case Oil Level (FWD) – 3-30
9. _____ Upper Link & Hitch – 2-17, 2-18
10. ____ Brake Adjustment & Pedal Equalization – 3-29
11. ____ Rear Wheel Bolt Torque – 122 N·m - 3-27
12. ____ Front Wheel Bolt Torque – 88 N·m - 3-27
13. ____ Front Wheel Toe-in – 3-28
14. ____ Fuel Level – 3-4

SAFETY ITEMS CHECKS

1. _____ ROPS Installed – 2-2
2. _____ Seat Belts Installed – 2-1
3. _____ ROPS Bolt Torque – 50 N·m.
4. _____ PTO Shield Installed – 2-14
5. _____ Safety Decals Installed – 0-9 ~ 0-13
6. _____ Neutral Start Switches Operation – 2-5, 2-6
7. _____ Parking Brake & Operation – 2-12
8. _____ Flashing Lights/Tail Lights Operation – 2-9
9. _____ Operator's Manual #300813020
10. ____ Horn Operation – 2-10

OPERATIVE SERVICE CHECKS

All operating checks are to be performed with tractor at normal operating temperature.

1. _____ Lights & Instruments for Proper Operation, & Fuel Shut Down with Key Switch OFF – 2-3 ~ 2-8
2. _____ Fluid & Oil Leaks
3. _____ Maximum No-load Speed & Idle Speed Adjustments – 5-1
4. _____ PTO Engagement & Disengagement PTO Lever – 2-14
5. Hydraulic System:
   - _____ Selector Lever for Position Control – 2-19
   - _____ Drop Rate Operation – 2-20
6. _____ FWD-Drive Lever Operation – 2-12
7. _____ Operation of H.S.T. – 2-13

TRACTOR MODEL NO. _____ **INSPECTION PERFORMED** _____

TRACTOR MODEL NO. _____ **WARRANTY EXPLAINED** _____

Owner's Signature _____ **Date** _____

Owner's Signature _____ **Date** _____

OWNER COPY

PRE-DELIVERY CHECKLIST

CHECK AND ADJUST AS REQUIRED

SXM54, SXM60 MOWER DECK

PRE-DELIVERY CHECKLIST

Inspect the Mid-Mount Mower thoroughly after assembly to be certain it is setup properly before delivery to the customer.

The following checklist is a reminder of points to inspect. Check off each item as it is found to be satisfactory, or after proper adjustment and lubrication is made.

( ) Check all bolts and other fasteners to be sure they are correctly torqued.
( ) Check that all cotter pins are properly installed.
( ) Check and make sure the driveshaft is installed correctly, and make sure the lock collar is seated on the tractor PTO shaft.
( ) Make sure the gearbox is properly serviced and the seals are not leaking.
( ) Check and MAKE SURE the blades are correctly installed and correctly torqued. 98 -118 N·m.
( ) Make sure all Safety Shields are installed and securely in place.
( ) Make sure all Safety Decals are in place and readable (Refer to pages 4-5 – 4-6 for decal location and identification).

⚠ DANGER ⚠

Always use an approved roll over protective structure (ROPS) for safe operation. Overturning a tractor without a ROPS, can result in serious injury or death. If your tractor is not equipped with a ROPS, see your SHIBAURA Dealer.

DELIVERY CHECKLIST

( ) Show customer how to make adjustments and how to check blade condition and security.
( ) Explain the importance of proper lubrication, and point out the lubrication points on the mower.
( ) Point out the Safety Features and options, and explain the importance of safety shielding.
( ) Add wheel weights, ballast in tires, and/or rear weight as necessary to improve tractor/mower stability.
( ) Make sure the tractor is equipped with a ROPS and seat belt, and explain the importance of their use.
( ) Explain the importance of correct lighting when operating at night, or close to public roadways.
( ) Give the Operator's Manual to the customer. Ask him to read and familiarize himself with manual information, especially all Safety Precautions.

DAILY CHECKLIST

( ) Check and make sure the mower is properly and securely attached to the tractor.
( ) Make sure all safety shields and guards are securely in place.
( ) Check all bolts and fasteners to be sure they are tight and clevis and cotter pins are secure.
( ) Check the condition of the mowing blades and make sure they are correctly torqued in place.
( ) Check air pressure in the tractor tires. (See the applicable Tractor Operator's Manual for tire pressures).

MOWER MODEL NO. _____ **INSPECTION PERFORMED** _____

MOWER SERIAL NO. _____ **WARRANTY EXPLAINED** _____

Owner's Signature _____ **Date** _____

Dealer's Signature _____ **Date** _____

DEALER COPY

PRE-DELIVERY CHECKLIST

CHECK AND ADJUST AS REQUIRED

CMS54, CMS60 TZ MOWER DECK

PRE-DELIVERY CHECKLIST

Inspect the Mid-Mount Mower thoroughly after assembly to be certain it is setup properly before delivery to the customer.

The following checklist is a reminder of points to inspect. Check off each item as it is found to be satisfactory, or after proper adjustment and lubrication is made.

( ) Check all bolts and other fasteners to be sure they are correctly torqued.
( ) Check that all cotter pins are properly installed.
( ) Check and make sure the driveshaft is installed correctly, and make sure the lock collar is seated on the tractor PTO shaft.
( ) Make sure the gearbox is properly serviced and the seals are not leaking.
( ) Check and MAKE SURE the blades are correctly installed and correctly torqued. 98 -118 N·m.
( ) Make sure all Safety Shields are installed and securely in place.
( ) Make sure all Safety Decals are in place and readable (Refer to pages 4-5 – 4-6 for decal location and identification).

⚠ DANGER ⚠

Always use an approved roll over protective structure (ROPS) for safe operation. Overturning a tractor without a ROPS, can result in serious injury or death. If your tractor is not equipped with a ROPS, see your SHIBAURA Dealer.

DELIVERY CHECKLIST

( ) Show customer how to make adjustments and how to check blade condition and security.
( ) Explain the importance of proper lubrication, and point out the lubrication points on the mower.
( ) Point out the Safety Features and options, and explain the importance of safety shielding.
( ) Add wheel weights, ballast in tires, and/or rear weight as necessary to improve tractor/mower stability.
( ) Make sure the tractor is equipped with a ROPS and seat belt, and explain the importance of their use.
( ) Explain the importance of correct lighting when operating at night, or close to public roadways.
( ) Give the Operator's Manual to the customer. Ask him to read and familiarize himself with manual information, especially all Safety Precautions.

DAILY CHECKLIST

( ) Check and make sure the mower is properly and securely attached to the tractor.
( ) Make sure all safety shields and guards are securely in place.
( ) Check all bolts and fasteners to be sure they are tight and clevis and cotter pins are secure.
( ) Check the condition of the mowing blades and make sure they are correctly torqued in place.
( ) Check air pressure in the tractor tires. (See the applicable Tractor Operator's Manual for tire pressures).

MOWER MODEL NO. _____ **INSPECTION PERFORMED**_____

MOWER SERIAL NO. _____ **WARRANTY EXPLAINED** _____

Owner's Signature _____ **Date** _____

Dealer's Signature_____ **Date** _____

NOTES

ISHIKAWAJIMA-SHIBAURA MACHINERY CO., LTD.

Head Office: 32-2 Honcho 1-chome, Nakano-ku, Tokyo, Japan
Telephone: 3-5334-7900 Fax: 3-5334-4464

SX21,SX24 300813020A 030501-002 R

Printed in Japan